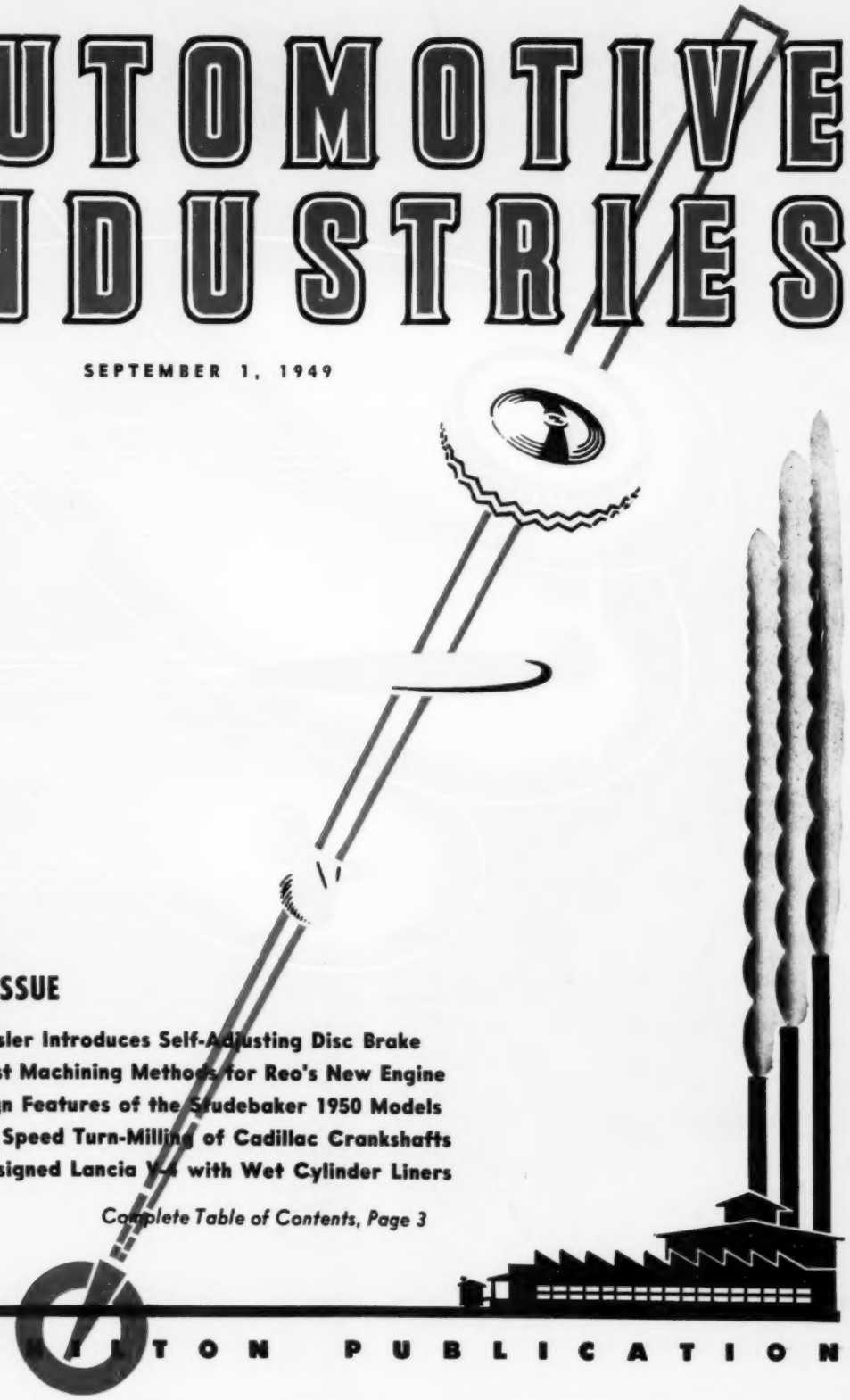
AUTOMOTIVE INDUSTRIES

SEPTEMBER 1, 1949



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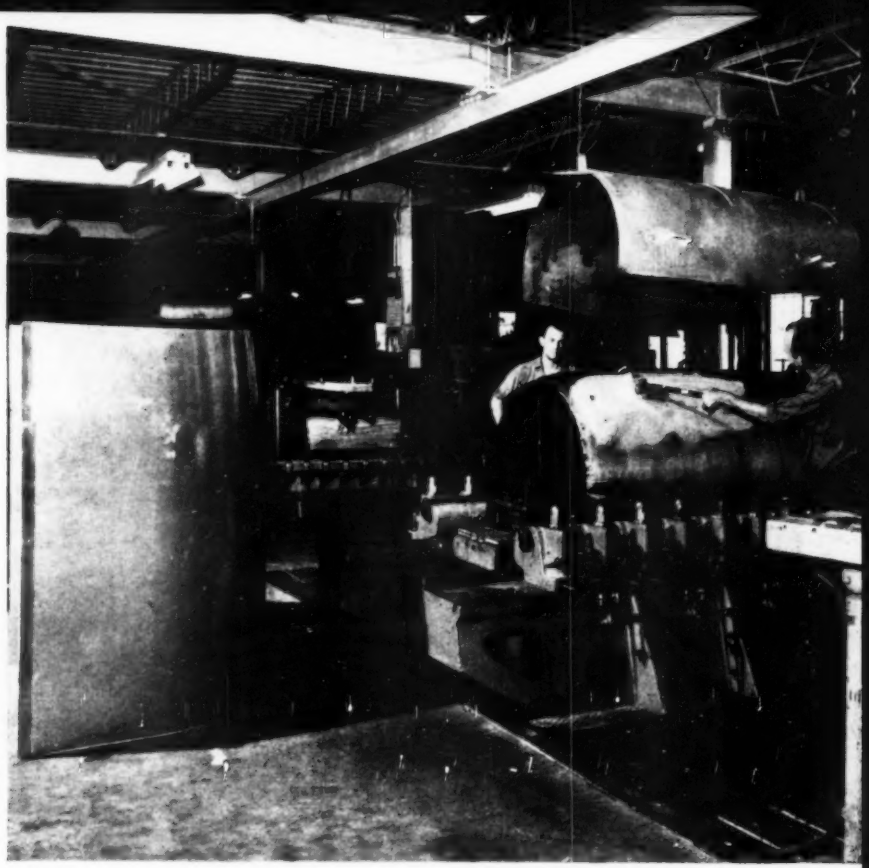
A CHILTON PUBLICATION



Better in the stretch . . .

SHOWN above is one of the stretch-forming press operations used by the Hart Pressed Steel Corporation, Elkhart, Indiana, to produce body parts for trucks and trailers. The parts are made from cold-rolled sheet steel, require draws of $3\frac{1}{2}$ to 4 inches.

Of the many drawing compounds tried on these forming jobs, Stanostamp C Compound proved more economical to use and provided adequate protection for both dies and parts. Despite the variety and depths of the stretch draws made in this plant, there has been no part spoilage due to faulty die lubrication in five years' use of Stanostamp C.

On many different forming operations, Stanostamp Compounds have shown their ability to improve the quality of the parts produced, to increase the life of dies and punches, to provide easier application and removal of the drawing compound. They are economical to use because they can be blended with water or oil in various concentrations to handle a wide variety of forming operations. One of Standard's Cutting Oil Engineers will help you obtain the benefits of these superior compounds on your drawing and stamping jobs.

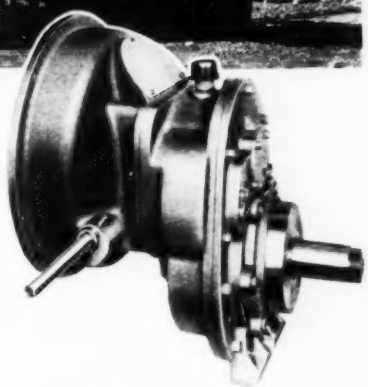
Stanostamp C Compound

Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA)

STANDARD

Cuts Cost... saves space... with COTTA Reduction Unit



Problem: Facilitate engine replacement in crane. Solution: Crane repowered with modern gas or diesel engine. Adapted new engine output speed to meet conditions in original crane mechanism by installing a Cotta Reduction Unit. Cotta's compact design saves valuable space. Cotta's rugged construction intended for heavy duty service.

THIS INFORMATION WILL HELP YOU

Sent free on request — diagrams, capacity tables, dimensions, and complete specifications. State your problem — COTTA engineers will help you select the right unit for best performance. Write today.

COTTA TRANSMISSION CO., ROCKFORD, ILLINOIS

An Assurance of Dependable Service

COTTA
HEAVY-DUTY
TRANSMISSIONS

"Engineered-to-order"

Only NICKEL ALLOY STEELS

combine the properties specified by FITZJOHN for SAFETY and THRIFT

SPECIFY almost any reasonable *combination* of high strength, toughness, hardness, ductility and other mechanical properties...

That's what nickel alloyed steels provide ... advantages that no unalloyed composition can match.

Furthermore, nickel alloy steels respond to mild quenching, provide high strength and elastic properties in large sections, and resist distortion and cracking in heat treatment of complex shapes ... all characteristics in which unalloyed steels are deficient.

The Super Duraliner shown above, and every intercity and city bus produced by Fitzjohn Coach Company, Muskegon, Mich., attest to the dependability and economy of nickel alloy steels.

Timken Axle Company of Detroit produce Fitzjohn's front axles with steering arms and knuckles of Type 3130 nickel-chromium steel, along with steering knuckle pins made from a carburizing nickel-chromium steel, Type 3120. These steels not only assure ample safety margins in the parts, but provide long, trouble-free service life.

In rear axles,..also furnished by Timken-Detroit ... all gears and pinions are of Type 4620 steel, a nickel-molybdenum grade which provides exceptional strength, resists impact and wear. This steel is readily machinable, and can be heat treated with minimum distorion.

The transmissions, produced by Clark Equipment Company of Buchanan, Mich., also utilize a nickel-molybdenum steel of the 4620 type to assure optimum dependability in all gears and supporting shafts.

Weight-saving, compactness, durability and strength ... as well as superior response to fabrication ... may be provided by the correct nickel alloy steel. Send us details of your problems for our suggestions. Write us today.

EMBLEM OF INCO SERVICE

Over the years, International Nickel has accumulated a fund of useful information on the properties, treatment, fabrication and performance of engineering alloy steels, stainless steels, cast irons, brasses, bronzes, nickel silver, cupro-nickel and other alloys containing nickel. This information is yours for the asking. Write for "List A" of available publications.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

AUTOMOTIVE INDUSTRIES

Published Semi-Monthly

September 1, 1949 Vol. 101, No. 5

Contents

One of the Publications Owned by

CHILTON COMPANY (INC.)

Executive Offices

Chestnut and 56th Streets, Philadelphia 39, Pa., U. S. A.

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AUTOMOTIVE INDUSTRIES is a consolidation of The Automobile (weekly) and the Motor Review (weekly), May, 1902; Dealer and Repairman (monthly), October, 1903; the Automobile Magazine (monthly), July, 1907, and the Horseless Age (weekly), founded in 1895, May, 1918.

AUTOMOTIVE INDUSTRIES, Vol. 101, No. 5. Published semi-monthly by Chilton Co., Chestnut & 56th Sts., Phila. 39. Entered as Second Class Matter October 1, 1925, at the Post Office at Philadelphia, Pa.; Under the Act of Congress of March 3, 1879. In case of Non-Delivery Return Postage Guaranteed. Subscription price: United States, Mexico, United States Possessions, and all Latin-American countries, $2.00 per year. Canadian and Foreign $5.00 per year; single copies, 25 cents, except Statistical Issue (Mar. 15th), $1.00.

This emulsion out-performs cutting oil

MACHINE:
No. 3A, Warner & Swasey Turret Lathe.

PART:
3" x 10" tapered flange, normalized S.A.E. 1040 steel forging.

OPERATIONS:
Drill 3" from solid, turn O.D., turn face, chamfer, tap tapered thread.

RESULTS:
With an emulsion of Texaco Soluble Oil Heavy Duty, threading speeds were same as when sulphurized cutting oil was used, but threads produced were smooth and passed critical inspection, machine output was increased, unit costs were reduced. Finish on all operations was excellent.

Texaco Soluble Oil Heavy-Duty increases machine output, reduces unit costs. Assures cleaner plant.

Emulsions made with *Texaco Soluble Oil Heavy Duty* are out-performing straight cutting oils on many jobs, such as broaching, drilling, turning and threading. They cool the work better, assure faster production and longer tool life.

In addition, there is less carry-off from emulsions with *Texaco Soluble Oil Heavy Duty*. This means savings in material consumption as well as in clean-up expense. These emulsions are highly stable and are not affected by normal contamination with the machine lubricant.

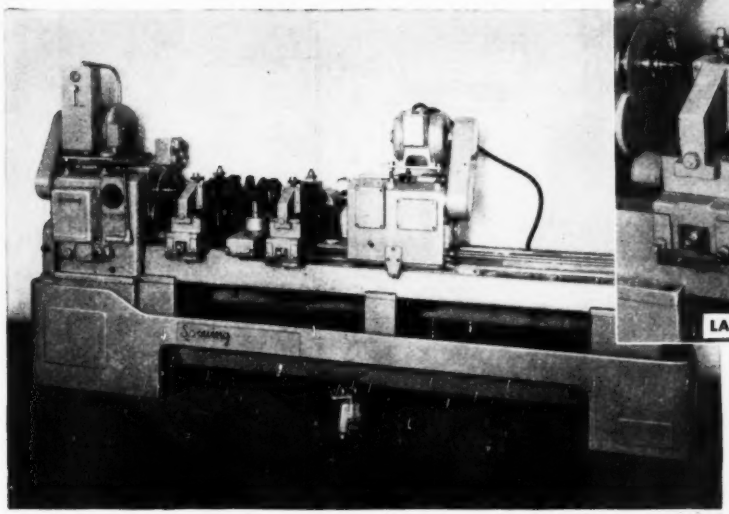
There is a complete line of *Texaco Cutting, Grinding and Soluble Oils*. A Texaco Lubrication Engineer will gladly help you select the right ones to give you greater output and lower costs whatever the metal or your method of machining it. Just call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, New York.

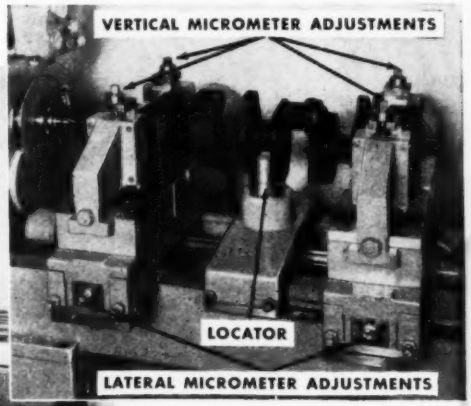
TEXACO

TEXACO CUTTING, GRINDING AND SOLUBLE OILS FOR FASTER MACHINING

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK





Machine shown with Coolant Guards removed from Drilling Spindles

MODEL "CS" AUTOMATIC CENTERING MACHINE CENTERS CRANKSHAFTS IN RELATION TO CENTER OF MASS BALANCE

Problem: Center automatically various types of crankshaft forgings in relation to center of mass balance.

Solution: The Model "CS" Automatic Drilling and Centering Machine selected for this job was equipped with special air operated vises having cross and vertical micrometer adjustment for the clamping jaws.

In operation, the first crankshaft forging of the lot is centered with all jaw adjustment dials set at zero. A crankshaft is then centered and tested for mass balance in a balancing machine, after which fine adjustments are made on the vise jaws. The machine is then ready to proceed with the centering operations on the run of a particular type of crankshaft.

Referring to the close-up view of the vises, note that each of the four jaws has independent vertical micrometer adjustment, while the cross or lateral adjustment is made with a single micrometer adjusting screw which operates the cross slide fitted to the body of the vise.

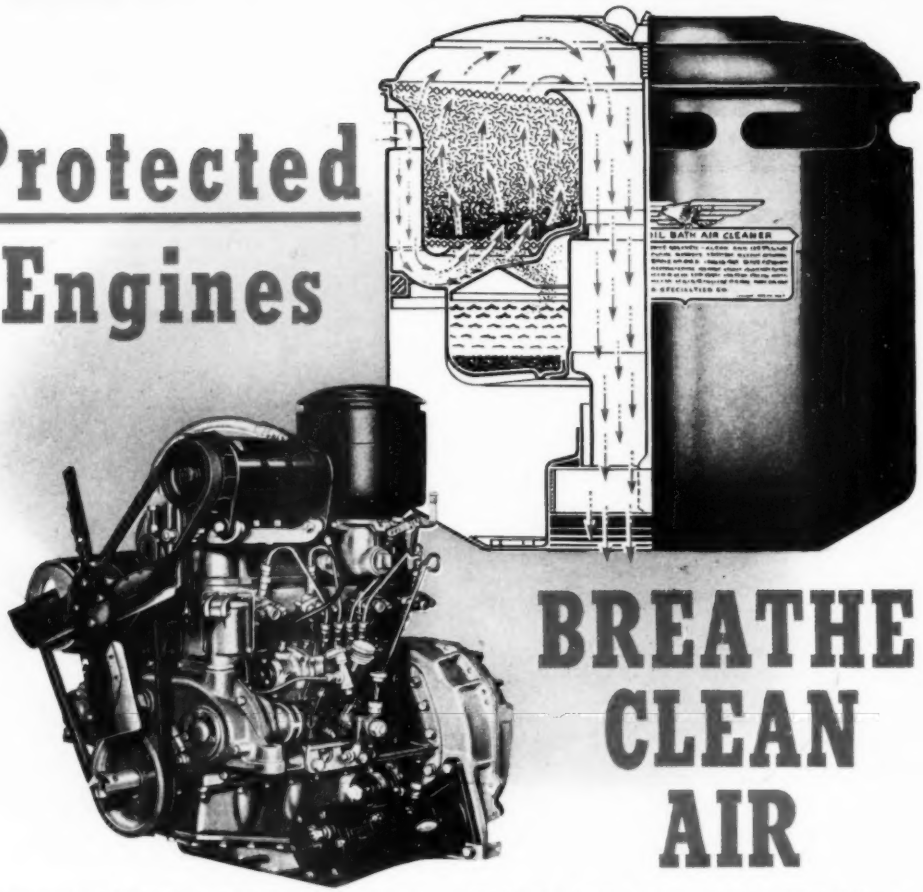
Located between the vises is a spring-operated locator which positions the crankshaft and maintains accurate depth of centering in relation to cheeks of one of the line bearings.

Engineered jobs are our specialty, and our staff is at your disposal to assist in solving your problems.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH Lo-swing

Protected Engines



BREATHE CLEAN AIR

Engines equipped with United Oil Bath Air Cleaners benefit from the finest air cleaner protection available . . . give better performance, wear longer, need less service attention.

Designed for highest cleaning efficiency throughout the entire range of engine speeds and loads, United cleaners remove over 99% of destructive dust and other grinding abrasives from air before it enters the engine. United cleaner construction is such that there is complete contact of air and oil, at all times at any operating angle, permitting only clean air to enter the carburetor.

United Specialties' quarter century of experience in the development of oil bath air cleaners has resulted in the design and production of 260 different air cleaner models—a type and size for every kind of internal combustion engine. In the past three years alone, over 5,000,000 United air cleaners have been produced, for use on cars, trucks, tractors, stationary power units — every type of internal combustion engine. When planning new engine designs, you will find our sales engineers helpful in discussing air cleaner application.

Hercules D00 Series four cylinder Diesel engines are protected with the United combination quart size Oil Bath Air Cleaner and silencer shown at top. Engine illustrated is used on two high production nationally known makes of trucks where Diesel power is required.

UNITED SPECIALTIES COMPANY

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AIR CLEANERS ★ METAL STAMPINGS ★ DOVETAILS
★ IGNITION AND DIRECTIONAL SIGNAL SWITCHES ★ ROLLED SHAPES

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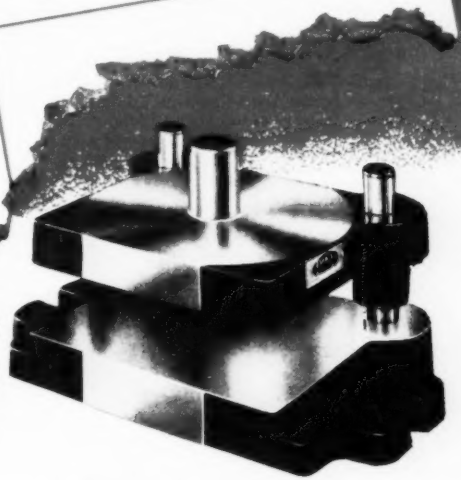
Check your Danly catalog. Select the standard die set that meets your requirements from the almost unlimited range of types and sizes available for prompt shipment.

2

Phone or wire your nearest Danly branch. A nation-wide system of assembly branches in major tool and die centers is at your service. Choose the one most convenient to you from the list below.

3

Your standard Danly Die Set is on the way—**promptly!** All Danly assembly branches are completely stocked with all standard die set parts. The set you want is assembled and shipped immediately upon receipt of your order.



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* indicates complete stocks

See how Danly's special die set machining service can reduce your costs...write for this free bulletin

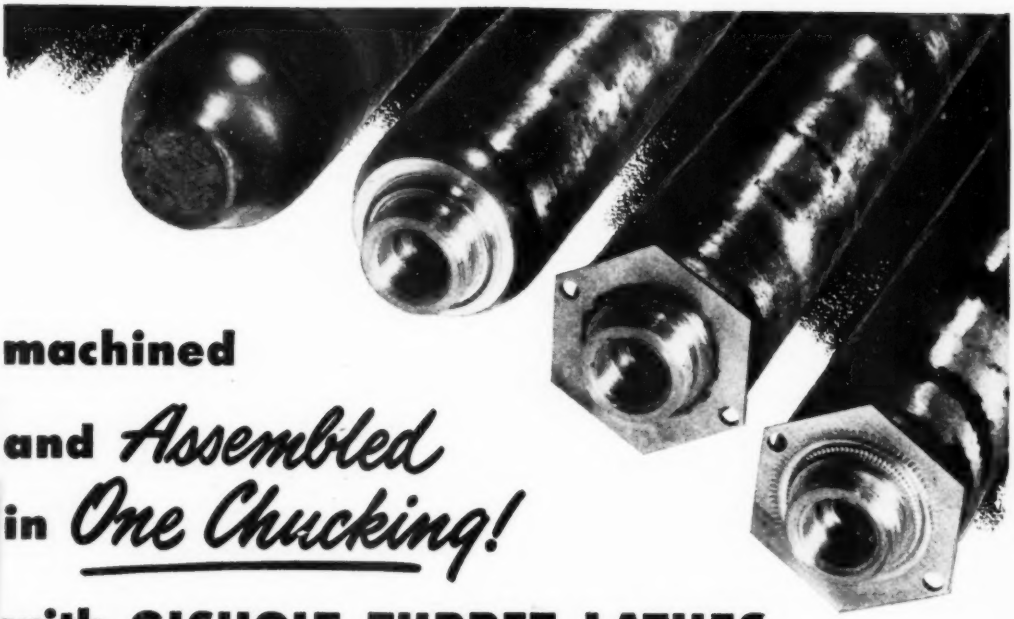
DANLY

PRECISION DIE SETS...standard and special

DANLY MACHINE SPECIALTIES, INC.

2100 South 52nd Avenue, Chicago 50, Illinois

OVER 25 YEARS OF DEPENDABLE SERVICE TO THE STAMPING INDUSTRY



machined and *Assembled* in *One Chucking!* with GISHOLT TURRET LATHES

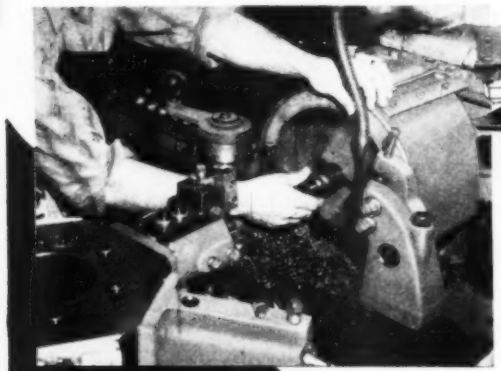
Talk about clever ideas! Here's one used by the Ansul Chemical Company, manufacturer of dry chemical fire extinguishers, to cut time, cut costs and do a better job.

Eight different operations on these gas pressure cartridges are performed on a Gisholt No. 5 Ram Type Turret Lathe as follows: Turn, face, bore, thread, tap, attach splined collar, groove collar, and roll edge. And all in one chucking!

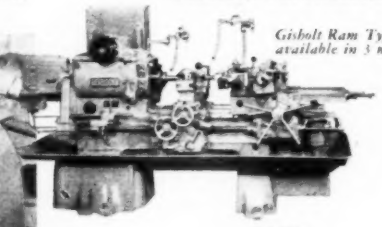
Combining all these operations on a Gisholt Turret Lathe eliminates another handling and welding operation—saves from 30% to 40% of former time. What's more, it has resulted in more uniform work and better appearance.

It's another example of using ingenuity to save money. Gisholt engineers are ready to give you the best of their experience—to help cut *your* time and costs. Write us.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin



While part is still turning, splined collar is placed over neck of cartridge. Collar is then grooved and rolled to insure a snug fit that prevents turning or loosening.



Gisholt Ram Type Turret Lathes are available in 5 models with standard chuck sizes ranging from 8" to 15".

GISHOLT

The Gisholt Round Table *represents the collective experience of specialists in the machining, surface-finishing, and balancing of round and partly round parts. Your problems are welcomed here.*

TURRET LATHES · AUTOMATIC LATHES · SUPERFINISHERS · BALANCERS · SPECIAL MACHINES

MECHANICAL HANDLING SYSTEMS, INC.

REDUCES TRAILER WEIGHT 22% with J&L OTISCOLOY HI-TENSILE STEEL SHEETS

J&L STEEL

Automobile-transport trailer under construction at Mechanical Handling Systems, Inc., Detroit, Mich. The J&L OTISCOLOY high-strength steel-sheet parts are easily formed and joined.

The high-strength steel trailer ready to get underway. Each automobile is safely cradled on OTISCOLOY sheet-steel tracks.

High-strength steel cuts ton-mile costs for operators of huge automobile transport trailers.

Maximum structural strength, rigidity and fatigue resistance are essential in huge automobile carrier trailers like those built by Mechanical Handling Systems, Inc., of Detroit, Mich. But these characteristics must be obtained with the very minimum of dead weight. Therefore high-strength steel is used almost entirely.

In the trailer illustrated, the use of J&L OTISCOLOY sheet helps to reduce dead weight from 9,000 lbs. to 7,000 lbs.—*a saving of 1 TON, or 22%!*

In many structures, the use of J&L OTISCOLOY reduces dead weight *as much as 35%* without loss of strength, because:

J&L OTISCOLOY

—Has twice the yield strength of mild steel

—Has 50% greater fatigue resistance than carbon steel

—Is resistant to abrasion

—Resists atmospheric corrosion 6 times better than carbon steel

J&L OTISCOLOY can be worked by any standard metal-working method . . . formed hot or cold . . . welded . . . flame-cut. Its ability to hold paint and resist corrosion further widens its applications.

Let us send you a copy of: "OTISCOLOY High-Tensile Steel." Mail the coupon today.

JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L *manufactures a full line of carbon steel products, as well as certain products in* OTISCOLOY *and* JALLOY *(hi-tensile steels).*

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

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Please send me at once a copy of your booklet: "OTISCOLOY High-Tensile Steel."

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Make "Standard" Your Source for BOILER and PRESSURE TUBING
NDARD TUBE COMPANY
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STANDARDIZE with STANDARD — It Pays
Here are the most modern and complete facilities for the manufacture of Boiler and Pressure Tubing found anywhere. "Standard's" 25 years of experience and leadership in the manufacture of Welded Steel Tubing dictated the planning of this great new plant. And because it is so designed, "Standard" is able to better supply you for all your Boiler and Pressure Tubing requirements.
SIZES ½" to 5½" OD, up to .260 wall thickness to all code and government specifications.
Specify "STANDARD"—*it pays!*
MECHANICAL • STAINLESS • RIGIDIZED • BOILER AND PRESSURE • SPECIAL SHAPES

It Changed a Nation's Attitude!

To own a convertible automobile has been a repressed desire of many motor car purchasers. But in the past, the appeal of an open model has had to compete with the inherent love of comfort and convenience. Today—thanks to Detroit Harvester's Dura and Motor State Products Divisions—the convertible emerges completely unfettered by the negatives of yesterday!

Detroit Harvester engineers have been responsible for design innovations which have reduced unsightly linkage, eliminated blind spots common in early models, made the convertible a snug, all weather car. And Detroit Harvester Hydro-lectric operating mechanisms have transformed the "one man" top into the "one finger" top.

* * *

Hydro-Lectric Top, Window, and Seat Control Systems
Convertible Tops • Automobile Body Hardware
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Bendix Products

BUILDERS OF THE BASICS OF

BETTER MOTOR VEHICLES

DEALERS AND TRUCK OPERATORS AGREE...

HYDROVAC IS FIRST CHOICE!

Everything truck operators look for in power braking, they find in greater degree and for less cost in the Bendix Hydrovac*. It gives them easier, smoother, quicker stops with less physical effort. A record number of Hydrovac installations—over 2,000,000 at present—bears out this claim. Ask the man who uses Hydrovac about its performance . . . ask the man who services it about the upkeep . . . and you'll see why Hydrovac is first choice! This preference indicates the value of including Bendix Hydrovac power braking in your original equipment specifications.

*REG. U. S. PAT. OFF.

BENDIX PRODUCTS DIVISION of
SOUTH BEND 20, INDIANA

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AUTOMOTIVE INDUSTRIES

The Authoritative Technical and News Magazine That Gives Comprehensive Coverage, Domestic and Foreign, of These Industries:

Passenger Car	Engine	Parts and Components
Truck	Body	Accessory
Bus	Trailer	Production Equipment
Aircraft	Road Machinery	Service Equipment
Tractor	Farm Machinery	Maintenance Equipment

AUTOMOTIVE INDUSTRIES
Reg. U. S. Pat. Off.

High Spots of This Issue

Fiat's Modernization with American Dollars

To put the Fiat Co. of Italy back on its feet a multi-million dollar modernization program is being activated, backed by Marshall Plan aid and the Export-Import Bank. How over 11 million dollars' worth of orders will be placed with American firms for automotive machine tools, as here revealed, makes significant reading, page 24.

Chrysler Self-Energizing Self-Adjusting Disk Brake

An entirely new type brake to be standard soon on Chrysler Crown Imperial models is announced and points of interest summarized in this amply diagrammed account, page 26.

Studebaker's Three Models Groomed for '50 Buyers' Market

Skillful tailoring of Studebaker's Champion, Commander, and Land Cruiser afford striking style changes in their designs for 1950. Mechanically, coil spring independent front suspension, increased engine hp and compression ratio—plus improved steering linkage—are said to smooth out rough roads to an almost boulevard-like ride. Details start on page 28.

Machining of Reo Gold Comet Engine Parts—Part I

Modernity of the equipment and tooling for producing the new Reo Gold Comet overhead valve engine represents the latest versions of mass production techniques developed in the automotive industries. Part I (of two parts) follows the machining stages of the cylinder head and block, page 32.

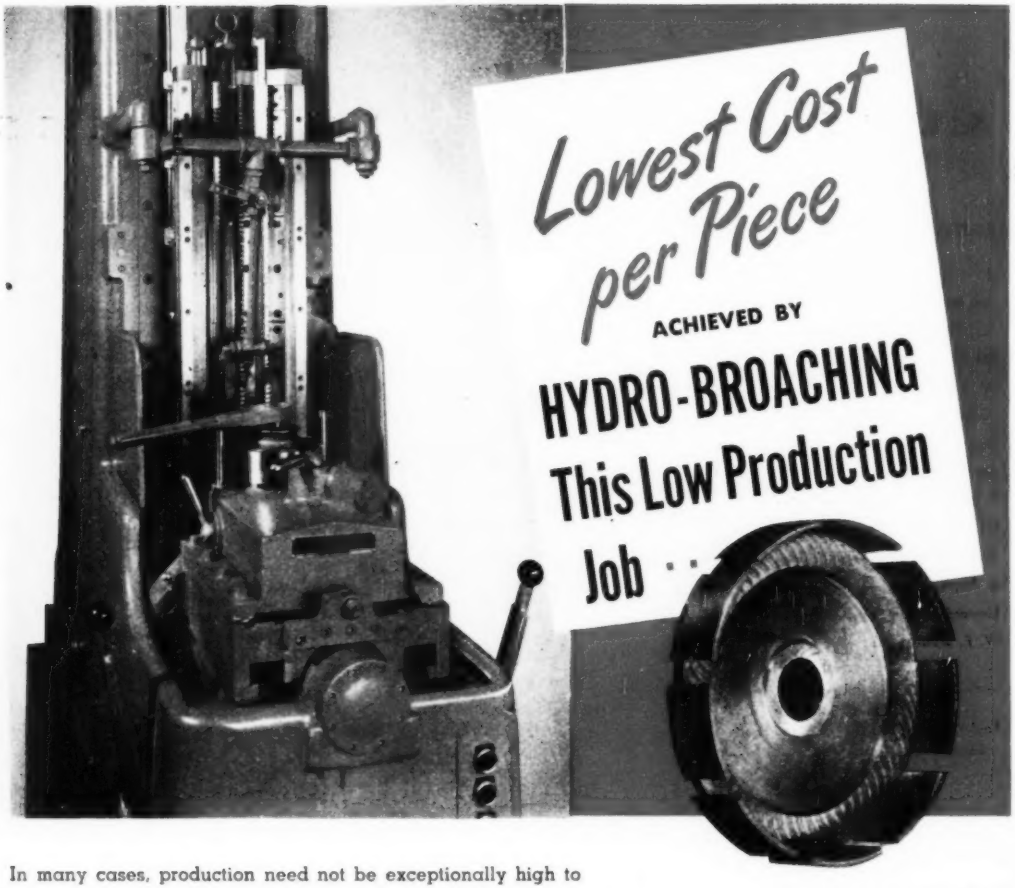
High Production Turn-Milling of Cadillac Crankshafts

Two entirely new machines called "Turn-Mills" are employed among other latest equipment at Cadillac to radically reduce crankshaft roughing time. Story of how Cadillac machines crank pins, main bearing journals, cheeks, and counterweights is revealed at length, starting on page 40.

22 New Product Items And Other High Spots, Such As:

Increasing the output of induction hardened parts with automatic work fixtures; the Talbot 16-cyl Grand Prix engine; the redesigned Lancia V-4 engine with wet cylinder liners; and the challenge to designers presented in the air conditioning of motor cars.

News of the Automotive Industries, Page 17
For Complete Table of Contents, See Page 3



Lowest Cost per Piece

ACHIEVED BY

HYDRO-BROACHING This Low Production Job . . .

In many cases, production need not be exceptionally high to gain the advantages of broaching. A typical example is shown here. Only 50 parts are broached per hour, but at a lower cost and within more consistent accuracy than obtainable by other methods. ¶Cincinnati Application Engineers tooled up a CINCINNATI No. 3-48 Single Ram Vertical Hydro-Broach for the job. Nine slots ⅜" wide are broached through the skirt of low range reaction gears. The inserts (broaching tools) are arranged in three rows, to broach three slots in one stroke. To keep the cost down, the fixture is manually operated, both for clamping and indexing. ¶CINCINNATI Hydro-Broach Machines, completely tooled up and ready for production, have reduced the cost of broaching many low production parts, especially groups of parts having family characteristics. These machines and Cincinnati Application Engineers can do just as much for you in paring costs. May we hear from you?

Part Name	Gear, Low Range Reaction
Material	SAE 1050 Steel
Operation	Broach 9 Slots
Depth of cut	From Solid
Production	51 Per Hour
Machine	CINCINNATI No. 3-48 Single Ram Vertical Hydro-Broach with complete tooling

CINCINNATI Single Ram Vertical Hydro-Broach. Complete details on all features may be obtained by writing for catalog M-1389-2.

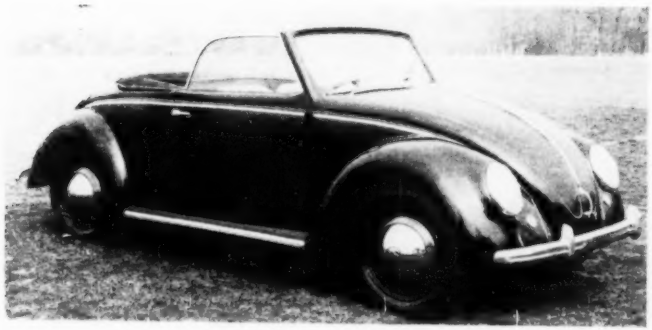
THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U. S. A.

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES
FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

NEWS *of the* AUTOMOTIVE INDUSTRIES

Vol. 101, No. 5 **September 1, 1949**



FOLKSY WAGON

This is one of the two new convertible models recently announced by the Volkswagen factory in Hamburg, Germany. With body by Joseph Hebmuller, the car has an improved finish, better upholstery, tougher bumpers, and padding to reduce vibration.

Car Registrations Show Leveling Off Trend

Early tabulations of registration statistics compiled by R. L. Polk & Co. indicate a drop for the second straight month from the previous postwar high established in May. At the same time, production continues at a record rate indicating that stocks in dealers' hands are building up although they cannot be said to be excessive, and in many cases they are still far below normal.

While August production figures are not available officially, estimates indicate a new all-time monthly total of between 640,000 and 650,000 cars and trucks. The previous high point was 621,910 set in April, 1929. It is now believed that production during September will not meet the August level, and that output during the last quarter will not be as high as during the third quarter. However, it is still the consensus that total production of cars and trucks this year will set a new all-time record, although truck production will be below the record set last year.

Reo to Sell New Truck Engine as Replacement Unit

Reo is going to offer its new six-cyl. overhead-valve 331 cu in. Gold Comet engine as a replacement unit for all makes of trucks. The engine develops 140 hp at a governed speed of 3200 rpm. It will be sold in a package which includes fan assembly, generator, oil filter, starter, coil, spark plugs, governor, fuel pump distributor, carburetor and air cleaner, front cross member, front and rear engine mountings, muffler, and tail and exhaust pipes. The engine will have a list price of $975, plus taxes. Sales will be handled through service departments with the company's branches, distributors and dealers.

Continental Tests New Double-Deck Bus

Prior to being placed in service, the Continental Bus System's new Continental coach (pictured on page 20, Dec. 1, 1948, AUTOMOTIVE INDUSTRIES) has received final road tests. The overall length of this deck-and-a-half observation coach is 35 ft, and it is powered by a 265-hp Hall-Scott engine. Incorporating the added refinements of travel, such as lavatory, buffet service, and radio, the bus can seat 12 passengers on the lower level and 20 on the upper deck level. Forged aluminum wheels, equipped with new wire cord, blow-out proof tires, carry the 23,000-lb vehicle over the road. The coach body of the Continental is of integral type construction, and features the principles of design used by ACF-Brill company for many years.

K-F Loss $2.3 Million in Second Quarter

The Kaiser-Frazer Corp. has reported a net loss of $2,336,518 for the three months ended June 30, bringing the net loss for the first half of this year to $8,141,816. In the second quarter of 1948 the company earned $3,916,000, and in the first six months $6,204,000. Adjustments made necessary by the company's entrance into the lower priced and utility automobile fields were reflected in the second quarter report, according to Edgar F. Kaiser, president. He said that retail sales in the second quarter of this year, following introduction of the company's utility models, followed a consistent upward curve with sales exceeding production schedules, which were increased to almost twice those of the preceding three months.

Esso Head Sees All Car Makers Producing H-C Engines

It will be only a matter of time until all manufacturers of automobiles will be putting out cars with high-compression engines. This was the opinion expressed by M. J. Rathbone, president, Esso Standard Oil Co., who was in Buffalo for an inspection trip of company properties. "The high compression engines," he said, "offer real economy in the consumption of fuel, plus improved performance. The oil companies are preparing to meet the trend with higher octane gasoline."

Automatic Transmission Activity at Hot Pace

As it stands now the automatic transmission situation appears something like this: GM is furthest advanced with two—Hydra-Matic and Dynaflow—already in use, a third unit, the Chevrolet torque converter just getting into production at the Cleveland plant for introduction on the 1950 models, and a new fourth type under development,

said to be a combination of the best features of the torque converter and the Hydra-Matic. Ford is already using the Hydra-Matic on the Lincoln, and is working intensely on some kind of automatic drive for both Mercury and Ford. There is some indication that Hydra-Matic might go on the Mercury later, although the company is working closely with Borg-Warner and might adopt a torque converter type similar to that used by Studebaker.

The plans of Chrysler are well shrouded in secrecy, but it is known that a large group of engineers are working on an automatic drive of the torque converter type. Nash will have the Hydra-Matic as optional equipment on its Ambassador series shortly after the new model announcement in September, and Studebaker will offer the Borg-Warner torque converter type early next year. Packard has a torque converter with direct mechanical drive in high gear available. Little is known about any definite plans by Hudson and Kaiser-Frazer, but it is assumed that these companies will sooner or later adopt an automatic transmission built by an outside supplier.

Defendants Ask Dismissal In Tucker Corp. Case

The Federal court in Chicago will hear arguments Sept. 13 on nine different motions filed by defendants in the government's case against the Tucker Corp. Five motions to dismiss the indictment against them were entered for Preston T. Tucker, president; Floyd D. Cerf, head of the syndicate selling the Tucker stock; Mitchell W. Dulian, Otis Radford, and Robert Pierce, former officials and directors; and Harold A. Karsten, who was active in promoting the company. A motion to dismiss the conspiracy count alone was filed by Fred Rockelman, former vice president and director, and Cliff Knoble, advertising director. In addition, petitions by Cerf, Pierce, Dulian and Radford asked for separate trials.

Federal Now Producing New Forward Control Chassis

The new Federal F-105 forward control chassis (shown on this page) is powered by a T-6427F valve-in-head engine with 427-cu in. displacement developing 155 hp at 2600 rpm. A model DXLD Diesel engine of four-stroke design with a 426-cu in. displacement and 142 hp can be furnished as well as a Federal T-6371F 133-hp valve-in-head engine as optional equipment. Federal has stated that engine models T6371F, T6427F, and R6602F all feature exhaust valves that are sodium filled and are of the rotating type, fitted with a bronze valve guide of unusual length. Exhaust valve inserts are of high speed steel, Stellite-faced with the seat exceptionally well surrounded by water.

The F-105 is equipped with a 35000 Series Timken over-size front axle having a wide track of approximately 80 in. resulting in shorter turning radius and greater maneuverability. The rear axle is of the hypoid single speed type with a 71½ in. track and a standard ratio of 5.28 to 1.

New California Plant to Supply Ford Radiators

Volume production of automobile radiators will soon be undertaken for the first time in California in order to supply Ford Motor Co.'s western assembly plants, it was announced by Fred Rumball, manager of Ford's West Coast purchasing program. He revealed that the Modine Manufacturing Co., of Racine, Wisc., has concluded negotiations for a new plant at Whittier, 16 miles from Los Angeles, and expects to start production soon. The new plant will furnish radiators to Ford factories at Long Beach and Richmond, Calif., and Dallas, Tex., and to the Lincoln-Mercury factory at Los Angeles. Initial rate of production is expected to average $3 million annually.

Dept. of Commerce Predicts Continued Truck Demand

Survey of Current Business, U. S. Dept. of Commerce publication, states that deferred truck replacement demand would support production of about a million trucks yearly for four years if spread uniformly. It believes, however, that it is likely a lower rate will prevail although it should stay well above the prewar rate for the next several years.

FORWARD BY FEDERAL

Primarily designed for urban and interurban bus service, this new Federal F-105 heavy duty commercial chassis of the forward control type is now being made by the Federal Motor Truck Co. Available in wheelbase lengths ranging from 120 in. to 240 in., about 4½ ft shorter than present comparable Federal chassis, the F-105 has a GVW of from 20,000 to 23,000 lb depending upon the vehicle's equipment and application. The unit is designed for 29 to 33-passenger service.

Italy Made 34,586 Vehicles In First Half of 1949

During the first six months of this year, Italy produced 34,586 automobiles of all types, compared with 27,778 for the corresponding period of 1948. The total was composed of 25,936 passenger cars; 5880 light delivery vehicles; 2024 trucks; and 746 buses or coaches. Exports for the six months totaled 7726 units, compared with 5543 for the previous half-year. Passenger cars and light delivery vehicles totaled 7236 and trucks numbered 490.

NEWS *of the* AUTOMOTIVE INDUSTRIES

According to the latest statistics available, the number of motor vehicles registered in Italy on January 1, 1949, amounted to 410,219 or some 13 per cent more than before the war. A detailed comparison is shown in the table below:

	1938	Jan. 1, 1947	Jan. 1, 1948	Jan. 1, 1949
Motor Cars	283,103	149,649	184,060	218,539
Trucks	78,452	135,933	184,922	191,680

Crosley Appoints Two to Top Sales Posts

Powel Crosley, Jr., president, Crosley Motors, Inc., has announced that Stanley E. Kess has been named vice president in charge of sales, and that H. M. MacDonald has been appointed director of sales. Associated with Crosley since its founding in 1945, Mr. Kess has been sales manager for the past year. Mr. MacDonald was formerly regional manager for De Soto, and prior to joining Crosley as sales supervisor in Minnesota, Wisconsin, and the Dakotas last May, had been regional and divisional manager for Kaiser-Frazer.

Over 500 Applicants for London Car Show

Applicants for booths in the London automobile show, the first of the European season, which opens on Sept. 28, total 516. There are 53 passenger car manufacturers. American makers include Chrysler, GM, Hudson, Lincoln and Studebaker. The French industry is represented by Citroen, Delage, Delahaye, Hotchkiss, Panhard, Peugeot, and Renault. Italy sends Fiat and Lancia, and Mercedes-Benz is the sole German representative. This year there will be no display of trucks and coaches.

Hot Rod Show in Los Angeles Next January

The Third Annual Hot Rod Exposition and Automotive Equipment Display will be held Jan. 26-29, 1950, in Los Angeles. The Exposition, which has drawn over 131,000 paid admissions in its two previous stagings, will be expanded to include a greater variety of automotive equipment, motorcycles, and foreign cars.

Big Boost in West Coast Car Registrations

One of the most interesting facts disclosed in the forthcoming Automobile Manufacturers Association annual statistical yearbook, *Automobile Facts and Figures*, is that a larger percentage of new car production is being sold in Pacific Coast states than prewar. In California alone total passenger car registrations have increased by nearly 600,000 units since 1941, and this increase alone is greater than the combined total car registrations of New Hampshire, New Mexico, Wyoming, Vermont, Delaware and Nevada.

FOR CLOSE SCRAPES

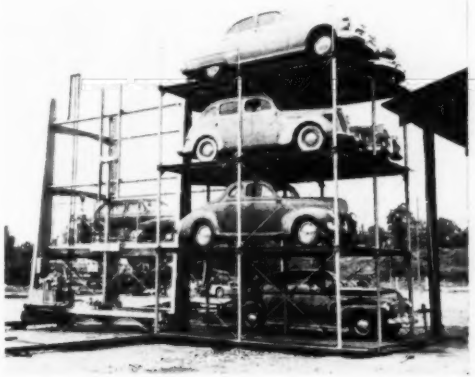
This new Euclid scraper has two GM Diesel engines, series 671; one powers the tractor, the other the rear wheels. Each engine is connected to the drive axle through an Allison torque converter and Torqmatic transmission (described on page 26, Aug. 15, Automotive Industries). Overall length of this unit is 44½ ft, and the capacity of the bowl heaped is 24 cu yd.

Ford Plans Pressed Steel Parts Plant at Buffalo

The Ford Motor Co. will build a new pressed steel plant near Buffalo to produce body parts for Ford passenger cars. Currently 49 per cent of the total Ford body stampings are being produced at the Rouge plant, with the balance being furnished by outside suppliers. When the new unit is completed, it will supply approximately 42 per cent of Ford's needs, with the Rouge providing 45 per cent and balance by outside suppliers. Construction of the new plant, to be located in Hamburg Township, will start this fall. It will be a one-story building with approximately one million sq ft of floor space. It is not expected that full capacity production will be reached until about two years from this fall. Location of the plant at Buffalo was influenced by the availability of major steel sources and excellent rail and water shipping advantages.

STACKS IN RACKS

Developed by Leo and V. A. Sanders, Portland, Ore., Pigeon Hole Parking, Inc., stacks cars four deep in steel fabricated storage racks by the use of a hydraulically-operated mobile elevator. A small lift within the mobile elevator slides out beneath the car to be parked, lifts and carries it into the main elevator. The 19-ft mobile elevator then moves sideways along standard railroad track, lifting the car to any of the four levels.



NEWS *of the* AUTOMOTIVE INDUSTRIES

Truck Builder to Offer Automatic Drive

One large truck manufacturer is planning to offer a torque converter with automatic drive on door-to-door delivery trucks in a few months. The nearest thing to such a device now in use is the Fluid Drive offered on the Dodge Route Van. Another company has built two experimental models with the GM Hydra-Matic transmission, but buyers have shown no great interest in ordering the units because of the added cost. Another possibility to watch is use of torque converter by Chevrolet on some of its smaller truck models. The division has a new transmission in early stages of production for its passenger car, and it is highly probable that it might be offered on door-to-door deliveries later. The transmission is to be announced on the 1950 model passenger cars about the first of the year.

Kurtis-Kraft Discloses Sport Car Changes

Kurtis-Kraft, Inc., has announced several changes in its sports car. Production changes and the availability of parts have made it advisable to change to 1949 Ford front suspension, Frank Kurtis, president has stated.

Ford Awards Nearly $200,000 for Suggestions

A report on the operation of the Ford employe suggestion plan for two years shows that more than 4000 employes have earned nearly $200,000, according to John S. Bugas, vice president—industrial relations. Payments have averaged $48.05, with seven employes earning the maximum of $1500 each for their suggestions. The average award has been $28.67 above the national average for such plans. Since the program was started in August, 1947, the company has adopted 5974 suggestions of the total of 23,810 submitted. Only three Ford units are not now covered by the program, but they will be in by the end of the year.

Goodrich Improves Process for Nylon Cord Tires

Development of a new method of building Nylon cord tires, resulting in an appreciable gain in tire mileage, safety, and riding comfort, has been announced by the B. F. Goodrich Co. The new method enables tires to be produced without the use of cross threads, or wefts. The Goodrich engineers claim that the new method results in all cords carrying a uniform share of the load and impact.

GM Engineer in Geneva for Travel Conference

J. H. Hunt, consulting engineer for GM, is in Geneva, Switzerland, as a member of the United States delegation to an international road transport conference. The purpose of the meeting is to reach agreement on a treaty to encourage and facilitate use of privately owned vehicles in foreign owned countries. The United Nations is sponsoring the conference. Problems under discussion at the meeting include some type of international driver's license, identity of vehicle and equipment such as lights and so forth, universal rules of the road, common warning and directional signals, and road markings.

Nat'l Motor Bearing to Build New California Plant

The National Motor Bearing Co. has contracted for the erection of a new half-million-dollar Arrowhead Rubber plant on a new eight-acre site at Downey, Calif.

Willys-Overland Forms Distributor Council

Willys-Overland has joined the increasing number of automobile manufacturers who are forming dealer or distributor councils to develop closer relations between factory management and the field. The council will consist of 10 distributors to represent the 10 Willys-Overland sales regions, and will hold quarterly meetings at Toledo. Membership in the council will be increased to 15 as the sales regions are increased to that number in the company's current expanded sales program.

Ford Completes Building of Test Hill at Rouge

The Ford Motor Co. has completed construction of a test hill at its proving ground in Dearborn. The hill consisting of a 17 per cent grade, and a 30 per cent grade was built from 116,000 tons of steel slag supplied by the Ford steel mills. It is paved with a 24-ft reinforced concrete ribbon protected by six-ft steel guard rails. It is now being used for testing automatic transmissions, brakes, bumper clearances, hill climbing performance, carburetion, clutch operation, and other performance factors.

GMC Coach Sales Half of Industry Total

GM's GMC Truck & Coach Div. during the first half of this year accounted for 55.5 per cent of total sales of motor coaches to common carriers. During 1947 the figure was 48.5 per cent and in 1946, 28.6 per cent. Although attaining a higher percentage of the industry total, sales for the first six months of this year were far behind the same level of last year. For the entire coach man-

NEW TRUCK REGISTRATIONS*

Arranged by Makes in Descending Order According to the Five Months' Totals

MAKE	June 1949	May 1949	June 1948	SIX MONTHS Units 1949	Units 1948	Per Cent of Total 1949	Per Cent of Total 1948
Chevrolet	30,559	32,882	25,968	172,510	154,286	37.06	28.86
Ford	12,975	16,446	21,695	82,104	118,852	17.64	22.23
Dodge	10,227	10,766	6,856	58,011	58,186	12.46	10.89
International	7,169	7,487	11,636	45,286	70,266	9.73	13.15
G. M. C.	7,920	7,570	5,609	39,528	34,522	8.49	6.46
Studebaker	4,953	5,209	2,987	28,232	23,534	6.07	4.40
Willys-Truck	1,323	1,628	2,841	11,346	12,918	2.44	2.42
Willys-Jeep	1,185	1,114	4,066	8,695	25,248	1.87	4.72
White	650	655	1,018	4,196	6,389	.90	1.19
Mack	483	529	814	3,044	5,526	.65	1.03
Diamond-T	401	451	859	2,949	5,573	.63	1.04
Reo	251	346	994	2,169	6,285	.47	1.18
Divco	337	378	527	1,903	3,243	.41	.61
Autocar	106	131	185	944	1,457	.20	.27
Brockway	97	113	200	775	1,680	.17	.31
Federal	91	148	324	744	2,606	.16	.49
Crosley	80	101	230	564	1,418	.13	.27
Pontiac	52	86		216		.06	
Kenworth	45	22	27	209	205	.04	.04
F. W. D.	15	29	53	194	431	.04	.08
Sterling	34	17	26	123	248	.03	.05
All Others	216	267	244	1,065	1,646	.36	.31
Total	79,089	86,375	87,117	465,426	534,517	100.00	100.00

* Data from R. L. Polk & Co.

ufacturing industry, sales for six months of this year amounted to 3178 units, compared with 11,263 in the full year of 1948, and 17,555 in 1947.

Wine Made Assistant to Auto-Lite Head

Lyman A. Wine has been named assistant to Royce G. Martin, president of Electric Auto-Lite Co. He has been sales manager of the lamp division in Cincinnati since joining Auto-Lite in 1942, and prior to that was associated with C. M. Hall Lamp Co. for 23 years.

Car Registrations Jump 10 Million in 3 Years

Registrations of new motor vehicles in the three-year period 1945-1948 totaled 10 million units, the shortest period in history in which 10 million cars were produced, according to the AMA. Previously, the shortest time required to produce that many vehicles was the five-year period, 1920-1925. AMA states that registrations are still climbing with more than 41 million cars, trucks and buses currently registered.

NEW PASSENGER CAR REGISTRATIONS*

Arranged by Makes in Descending Order According to the Five Months' Totals

MAKE	June 1949	May 1949	June 1948	SIX MONTHS Units 1949	SIX MONTHS Units 1948	SIX MONTHS Per Cent of Total 1949	SIX MONTHS Per Cent of Total 1948
Chevrolet	110,078	104,542	57,567	434,093	357,613	20.08	21.42
Ford	42,420	60,454	16,527	347,917	176,398	16.10	10.57
Plymouth	48,984	48,909	14,941	233,627	157,555	10.81	9.44
Buick	35,798	35,824	19,961	181,146	126,627	8.38	7.58
Pontiac	31,858	31,178	17,430	140,805	117,524	6.51	7.04
Oldsmobile	25,876	25,403	14,587	122,157	91,504	5.65	5.48
Dodge	23,262	19,610	9,280	106,513	104,167	4.93	6.24
Studebaker	20,312	19,626	13,267	90,259	72,935	4.18	4.37
Mercury	10,808	17,281	11,053	77,660	51,105	3.59	3.06
Hudson	15,103	15,065	11,686	77,186	59,006	3.57	3.53
Nash	12,982	12,152	10,573	64,810	61,619	3.00	3.69
Chrysler	11,277	10,918	4,783	58,529	50,478	2.71	3.02
Packard	10,064	9,367	8,007	48,450	38,159	2.24	2.29
De Soto	8,994	8,734	3,877	46,921	39,089	2.17	2.34
Cadillac	7,433	7,714	5,373	40,645	27,387	1.88	1.64
Kaiser	7,896	7,683	11,239	31,252	56,919	1.45	3.35
Lincoln	2,708	4,061	3,723	20,134	12,020	.93	.72
Willys	2,902	2,941	1,541	13,835	13,721	.64	.82
Frazer	1,599	1,983	7,004	11,336	36,292	.52	2.17
Crosley	879	970	2,734	6,160	13,481	.28	.81
British Ford	679	830	199	3,681	300	.17	.02
Austin	327	335	925	1,553	4,501	.07	.27
All Others	351	641	649	2,947	2,126	.14	.13
Total	432,470	446,281	248,926	2,161,816	1,689,528	100.00	100.00

* Data from R. L. Polk & Co.

be known as YB-35-Bs, and the eighth will be known as the YRB-49-A. The YB-35-Bs will be used for non-tactical purposes in advanced exploration of

A BATCH OF PATCHERS

Recently put into service by the Los Angeles County Road Dept., these four hot oil road patchers, with spacial cabs seating six-man crews, feature specially designed flat bed bodies mounted on Mack model LFSW six-wheel chassis. The 385-gal oil storage tank, immediately behind the cab, is equipped with coils to heat the oil by utilizing the engine's exhaust gas.

Northrop to Make Three New Jet Flying Wings

Under a modification program now in process at Northrop Aircraft, Inc., Hawthorne, Calif., three new versions of the U. S. Air Force's giant Flying Wing bomber are being built. One new version, designated the EB-35-B, is a six-jet Flying Wing which will serve as a flying test bed for the powerful XT-37-1 Turbodyne engine. The remainder of the fleet of new type Wings will also be powered by six turbojet engines, and six of these airplanes will Flying Wing-type airplanes. The YRB-49-A will be equipped with full long-range reconnaissance devices. All of the converted planes will be powered by new Allison J-35 turbojet engines, and the six engines on each plane will deliver a total of nearly 30,000 lb of thrust.

Army Revising Parts Catalog

Army Ordnance is revising its catalogue of automotive parts to reduce the number from about 700,000 items to about 125,000. In the process of revision it was discovered that many interchangeable parts had been listed under separate headings, and that there were several stock numbers for the same number. Also many items were found to be no longer required.

Equip DC-3 With Fire-Resistant Hydraulic Fluid

The Douglas Super DC-3 will be the first commercial airplane in aviation history to be completely equipped with a fire-resistant hydraulic fluid, it was disclosed by the company. The hydraulic system, improved to actuate gear-retracting and other mechanisms faster than on the original DC-3, will be operated with Skydrol, non-flammable type fluid developed jointly by Douglas Aircraft and Monsanto Chemical Co.

British "Planning" for Gasoline Stations

After deliberating for 30 months, a Government appointed committee has decided that British gasoline filling stations need the benefits of State planning. The report, which has been sent to the Board of Trade for adoption, recommends three grades of gasoline filling stations. Grade I should have a minimum of four pumps, with a storage capacity of 6000 gal, stocks of oil, water supply, driveway and forecourt, provision for refuelling under cover, frontage of 150 ft, air compressor, toilet ac-

commodation and a 12-hr service seven days a week. Grade II would require two pumps, 3000 gal storage capacity and service six days a week. For Grade III the minimum requirements would be one pump with 1500 gal storage capacity, and an adequate service during normal business hours. There are recommendations as to the distances gasoline stations should be placed apart on main roads. Control would be entrusted to the Home Office. If adopted, these measures would revolutionize the gasoline filling station business in England.

Packaging & Handling Show In Detroit, Oct. 4-6

An annual Protective Packaging Competition is to be held in connection with the Fourth Annual Industrial Packaging and Materials Handling Exposition at Detroit from Oct. 4-6.

Pontiac Buyers Turn to Lighter Colors

Lighter colors have made large inroads into the preference for "black" among Pontiac buyers, according to a report from L. W. Ward, general sales manager. He said that currently the company's two shades of green now account for nearly 25 per cent of the color preference on closed models, compared with 20.1 per cent for black, which has traditionally been the color leader. The darker shade of green accounts for 14.6, and the lighter green for 10.3 per cent. Gray and blue are also creeping up on the Pontiac color list, whereas maroon which for many years was second only to black is now far down the list.

New Organization to Publish Automotive Data Book

The Friction Materials Standards Institute, Inc., has been organized in New York State for the purpose of continuing the publication of the Automotive Data Book which was formerly issued by the Brake Lining Manufacturers' Association, Inc., now dissolved.

Canada Orders $25 Million Worth of U. S.-Type Jets

A contract between the Defense Department of Canada and the Canadair Co. of Montreal for the construction of 100 of the U. S. F-86 type of jet fighter planes will be signed soon. Unofficial estimates are that the cost will be about $25 million. Permission was obtained from the North American Aircraft Company for use of the design. The F-86, the first of which may be delivered by August, 1950, will become standard equipment for the RCAF and will replace the British-made Vampire.

ETCHED EXAM

Developed by Ford Motor Co. engineers, this method of examining metal structures to determine quality using ionized atoms is called cathodic vacuum etching. A metal sample, shown being tested by Don M. McCutcheon of the company's applied physics research department, is placed in a partial vacuum containing argon. A charge of 12,000 volts of electricity is sent into the vacuum, creating argon ions which bombard the metal's surface, knocking off minute particles and bringing out the true microstructure of the metal with greater detail and clarity.

Boeing to Make New Bomb Lifts

A contract for 16 new-type mobile bomb lifts for the U. S. Air Force has been awarded Boeing Airplane Co.'s Wichita Div., it was announced by the company. Calling for 10 lifts capable of handling bombs weighing up to 50,000 lb, and six lifts for transporting and loading 22,000 lb bombs, the contract is valued at $1,199,464.

Wrought Magnesium Corp. Plans Detroit Mill

Wrought Magnesium Corp., a newly formed company, is planning to build a new sheet and plate magnesium plant in the Detroit area. Considerable equipment, including a four-stand rolling mill has already been purchased, and plans for acquiring a 10-acre site are under way. Production capacity of the plant, which is expected to be in production within a year, will be 500,000 lb a month. It is expected that a large percentage of the company's production will be used for large types of military and commercial aircraft.

E. E. Wilson Retires from Air Industries Group

E. E. Wilson of Hartford, Conn., has retired as chairman of the Board of Governors of the Aircraft Industries Association.

Water Injection Increases Thrust Of Jet Engine

The GE-Allison J-33 centrifugal-type gas-turbine engine is now capable of delivering 5400 lb of thrust when water injection is used. The latest A-23 version produces 4600 lb of static thrust without use of water injection. When deliveries were started more than four years ago, the J-33 power plant delivered 3725 lb of thrust. The 5000th J-33 engine was recently delivered to the U. S. Air Force.

Quick Vehicle Insurance From Vending Machines

Vending machines designed for use in the nation's repair shops and service stations to provide accident insurance policies for motorists will be on the market soon. For 25 cents a day, the motorist will have $5000 coverage for personal injuries either in or out of his car. Goal Insuraide Machines, Inc., plans nation-wide distribution of its

coin-operated machines, beginning in California and Texas. Repair shops and service stations leasing the machines will receive a percentage of the premiums paid.

Borg-Warner Announces Canadian Distributor

Borg-Warner automotive replacement parts will be distributed in Canada by B-W-H Service Parts, Ltd., of Merritton, Ont., according to John W. DeLind, Jr., president, Borg-Warner International Corp.

Publish New Standards for Gear Engineering

Prepared by the Sectional Committee on Standardization of Gears, sponsored by the American Gear Manufacturers Association, and the American Society of Mechanical Engineers, a new edition of the American Standard Letter Symbols for Gear Engineering for use in those mathematical equations and formulas dealing with toothed gearing has been completed, according to the American Standards Association.

Instrument Show in St. Louis From Sept. 12-16

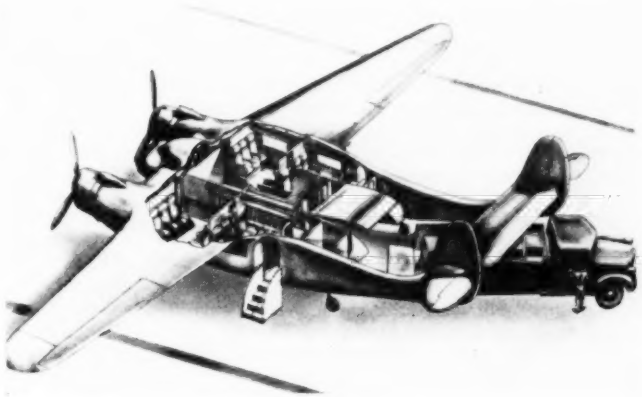
The Fourth National Instrument Conference and Exhibit is to be held in St. Louis from Sept. 12-16, the Instrument Society of America has announced.

Union Oil to Build New Research Plant

A $5 million research plant to be located near Brea, Calif., 25 miles south of Los Angeles, will be built by the Union Oil Co. to replace its present Wilmington (Calif.) research plant, Reese H. Taylor, president, has announced. Including 12 buildings, with a total of approximately 120,000 sq ft of floor space, the new facilities will occupy a tract of approximately 100 acres. Construction is scheduled to begin in September, and it is estimated that the plant will be ready for occupancy by September, 1950.

Name Ebel Vice President of Canadair

Formerly director of engineering for the Curtiss-Wright Corp., William K. Ebel has been named vice-president in charge of engineering for Canadair, Ltd.



MASTER OF LOADS

High military experts witnessed a four-day demonstration of the capabilities of the prototype Loadmaster air-cargo carrier, pictured above, recently at the Joint Air Training Center of the Royal Canadian Army and the Royal Canadian Air Force at Rivers, Manitoba. Both human and freight loads were carried and parachuted from the huge plane.

Code Revisions May Bring Tinted Glass Windshields

Current revisions underway in the safety glass code of American Standards Association may lead to use of tinted glass in the upper portion of car and truck windshields to cut glare. If proposed changes are adopted by ASA, state motor vehicle administrators are expected to go along with the revisions, with the result that the tinted glass windshields may become legal in most or all states. At least two GM divisions are already prepared to offer such windshields as optional equipment, but have been holding off because of state regulations.

Chilton Men On AEC Group

The Atomic Energy Commission has started a trial program for examining selected declassifiable technological information in the field of metallurgy with a view to determining its possible value to American industry. To assist in developing this program, a temporary advisory committee of representatives of professional societies and the business press has been appointed, and among the members of this group are Gene Hardy and W. A. Phair of the Chilton Co.

To Film Documentary of Indianapolis Race

Production of a documentary motion picture of the Indianapolis 500-mile racing classic is to be undertaken by Frank C. Meunier, manager of advertising and sales promotion, General Petroleum Corp. The picture, in color, is to be based on this year's record-breaking victory by Bill Holland in Lou Moore's Blue Crown Special.

Ford Orders Steel for New Buffalo Plant

The Ford Motor Co. has awarded a contract to the Bethlehem Steel Co. for 11,000 to 12,000 tons of structural steel for its large new stamping plant near Buffalo. The cost of the plant has been variously estimated at between $20 million and $50 million. The building will contain approximately 1 million sq ft. It will be a one-story structure 45 ft high, and will be 930 by 1200 ft.

Air Conditioning Units too Costly for Cars

Although automobile manufacturers have shown considerable interest in air-conditioning systems for automobiles, none has yet found any that is small enough and inexpensive enough to warrant serious consideration as factory installed equipment. A manufacturer of such equipment reports that he has made several installations in passenger cars on a custom basis at a retail cost of about $1200 to $1500. He is trying to sell car makers on building cars with proper insulation for air-conditioning, but with little success.

(*Turn to page 60, please*)

Fiat's Modernization

By Karl Rannells,

INITIAL steps have been taken in a multi-million dollar modernization program designed to put the Fiat Co. of Italy back on its feet. Backed strongly by Marshall Plan aid, as well as by the Export-Import Bank, Fiat plans to maintain its strong industrial position both in Italy and on the European continent.

As nearly as can be determined now, Fiat proposes spending around $60 million for improving and expanding its facilities which, in addition to automotive vehicles, produce agricultural equipment, Diesel engines, railway rolling stock, much of its own needs in iron castings and steel, and planes.

The end cost to ECA will probably amount to around $25 million while the Export-Import Bank may be expected to extend its loans to a possible $10 million. Fiat will finance the remainder of the cost out of its own resources and new money from Italian investors.

Fiat's improvement program will be in three phases. The first will completely modernize the mechanical and engineering activities of the company's 12 main plants at Torino and branch factories at Cameri, Modena, Pisa and Firenze. Two less costly programs will be completed later. These will concern the production and manufacture of raw materials as well as the firm's steel operations. The steel equipment program will cost over $15 million.

The first phase of the overall project, already approved by ECA and for which Fiat is now making commitments, involves the expenditure of nearly $35 million for mechanical and engineering improvements. Nearly half or about $14.5 million will be provided from ECA funds. Another $5.8 million will be extended by the Export-Import Bank, while Fiat will provide the remaining $14 million or so.

A substantial portion of the current expenditure will go into modern American steel-making equipment and machine tools for Fiat's automotive division. In this way, Fiat expects to lower costs and create a market for 80,000 or more units by 1952—double the 1948 output.

Officials of ECA told AUTOMOTIVE INDUSTRIES that Fiat plans to be on the market early next year with an entirely new and radically different car. Technical details, insofar as the ECA can give them, are relatively meager.

However, officials say that, generally speaking, the new 1950 Fiat will be made in 4-to-6 passenger models and will weigh about 2100 lb. In addition to streamline styling, plastics will be used extensively for such items as door and control handles, door and instrument panel trim. Also, new high-gloss paint processes will be instituted to give a luster not previously obtainable in Italian cars.

New Equipment for Fiat

OF the eventual $25 million expected from ECA for the overall modernization project, the Fiat Co. has requested $13 million on a firm commitment basis. The firm has placed, or will lay, contracts beginning with the sum of $3 million with the understanding that it will be reimbursed out of funds now authorized.

This amount is to be applied against orders for dies, jigs, and other tools, and machines for automotive production. A line of credit of $10 million is to be utilized in acquiring equipment, including the following types and their approximate totals:

Blooming mill and related equipment	*$985,000*
Forging and foundry equipment	*282,000*
Grinding machines, 40, including internal, external centerless, surface, honing, etc.	*676,000*
Presses, 14, including stamping, folding, etc.	*668,000*
Gear machines, 34, including shaving, cutting, lapping, roughing, testing, etc.	*388,000*
Milling and broaching machines, 17, including accessories	*363,000*
Lathes, 44, including Potter, Fay, Gridley, and other types	*653,000*
Boring and sharpening machines, 16, and copying machines, 2	*352,000*
Welding, 7, and related equipment	*101,000*
Aluminum casters, 5, and accessories	*88,000*
Drilling, 7, center-reaming, 5 sundry	*61,000*
Tapping machines, 11	*37,000*
Threading, heavy 3	*21,000*

with American Dollars

Washington Bureau,
AUTOMOTIVE INDUSTRIES

Marshall Plan help is based on the fact that Fiat interests, controlled by the Agnelli family, are solvent and are currently responsible for the employment of some 55,000 workers. Even greater employment and trade expansion is seen with increased and more efficient production.

On the basis of ECA studies, there is seen a strong demand for years to come. In the first place, Fiat has the automobile business well in hand in Italy (about 80 per cent of all car registrations are Fiats) and has always shipped quantities to other European countries (best prewar export year was 30,000).

As to the future, ECA estimates that the number of cars in Italy was depleted by nearly 150,000 during the war and on the Continent by 850,000 units. Obviously, a majority of those still in use are over-age and ready for replacement, if the price and cost problems can be licked. Even at current high prices, production fell short of demand last year by at least 15,000 units.

High pricing has been a postwar handicap for Fiat and the ECA studies indicate that a major cause has been the high materials cost and continued use of antiquated, if not obsolescent, mechanical equipment. Currently, the Fiat costs have been broken down roughly as 25 per cent for labor, 23.5 per cent for parts, 14 per cent for taxes, 13 per cent for steel, 4.5 per cent for iron castings, and 20 per cent for all other, including overhead.

By complete modernization of equipment and machinery, changing car design and factory layouts, and use of assembly line methods, costs are expected to drop substantially. Some of the estimated reductions include labor, by 15-20 per cent; parts, by 10-15 per cent; castings, by 30 per cent; and steel, by an undetermined amount.

A substantial portion of the $14.5 million to be made available now by the ECA will be spent for improvement of automotive production equipment. About $11.2 million worth of orders have been or will be placed with American firms for presses, lathes, welding, milling, tapping, threading, drilling, grinding, boring, gear and other machines. In addition, sizable orders are being placed with manufacturers who will build specialized equipment to order according to designs submitted by Fiat engineers. These include a number of machines for operations on cylinder blocks and cylinder heads, several for production of housings for axles and for transmission shafts, and varied others for milling, grinding and so on.

About $1.2 million of the current ECA authorizations will be set aside for replacement of machinery.

(*Turn to page 72, please*)

Growth of German Automobile Industry Alarms Italian Firms

Special to AUTOMOTIVE INDUSTRIES

Rome, Italy

WHEN in the beginning of 1948 the Occupation Authorities in Western Germany fixed a limit of 160,000 units a year for the output of the German automobile industry, not much attention was paid to this in Italy as it was thought that what with the great devastation sustained by German factories during the war, this figure would not be approached before 1952.

However, German factories turned out 65,388 motor vehicles in 1948 which is more than double the number produced in 1947 (25,337 vehicles). During the current year, over 12,000 units were manufactured in March registering an increase of 17 per cent over February. A further increase of only 11 per cent required to push the production up to the limit set, and thus it is likely that Germany will turn out 160,000 vehicles in 1949.

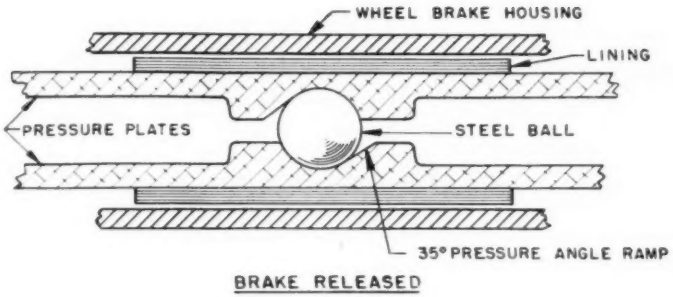
All this has worried Italian manufacturers about their markets. The new Mercedes 170 D is particularly alarming. It is equipped with a 38-hp Diesel engine and its mileage is 36 per gallon of fuel, making it one of the most economical cars in the world.

A good symptom of the situation are the Swiss imports of motorcars. During 1948 Switzerland imported 27,003 motor vehicles, of which 11,477 were supplied by the U. S., 5919 by Great Britain, 4540 by France, 2710 by Italy, and 2071 by Germany. Considering the fact that it is only during the last few months of 1948 that German sales of cars to Switzerland assumed a character of regularity, the last figure is particularly significant.

Reduction of car prices in Germany has started and likely will be extended to most makes.

Chrysler Announces

Self-Energizing,

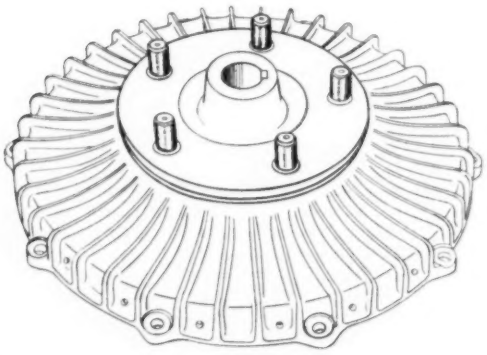


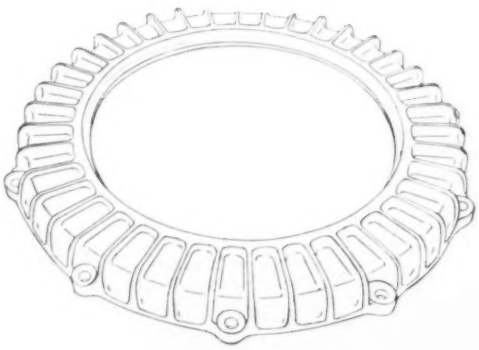
BRAKE RELEASED

CHRYSLER Corp. plans to put an entirely new type of self energizing disk hydraulic brake as standard equipment on its Chrysler Crown Imperial models to be introduced soon. An outstanding feature of this Chrysler brake is that it is self compensating, requiring no service adjustments during the life of the lining. Chrysler also claims that it provides 30 per cent greater lining area, better cooling and greater rigidity.

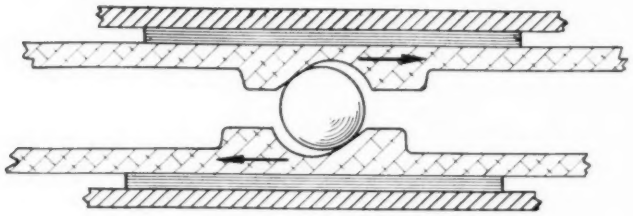
Essentially the new brake consists of two flat pressure plates inside a flat brake housing with six steel balls placed between the plates in small sockets. When the brakes are applied the outer plate is rotated by two hydraulic cylinders with respect to the inner plate and the balls are pushed out of their sockets and up onto small ramps in the plates, forcing them apart and into contact with the inside flat surfaces of the rotating brake housing. Motion of the car accelerates the action after initial pressure is applied. The outer surfaces of the plates are faced with brake lining sections attached by the Cycle-bond method. Chrysler states that expansion of the housing away from the lining is considerably less than with conventional shoe type brakes because the expansion is across the width of the housing parallel to its axis rather than along its diameter, and the distance across the housing is only about one-quarter of the diametral distance across a conventional brake drum.

Advantages claimed for the new self energizing brake are that it requires less foot pressure than any regular brake without booster, gives a greater number of successive stops under all conditions, has less tendency to fade, and provides greater safety with less pedal pressure descending long grades. The brake has been under development for many months and has been tested in both the laboratory and under thousands of miles of road work.



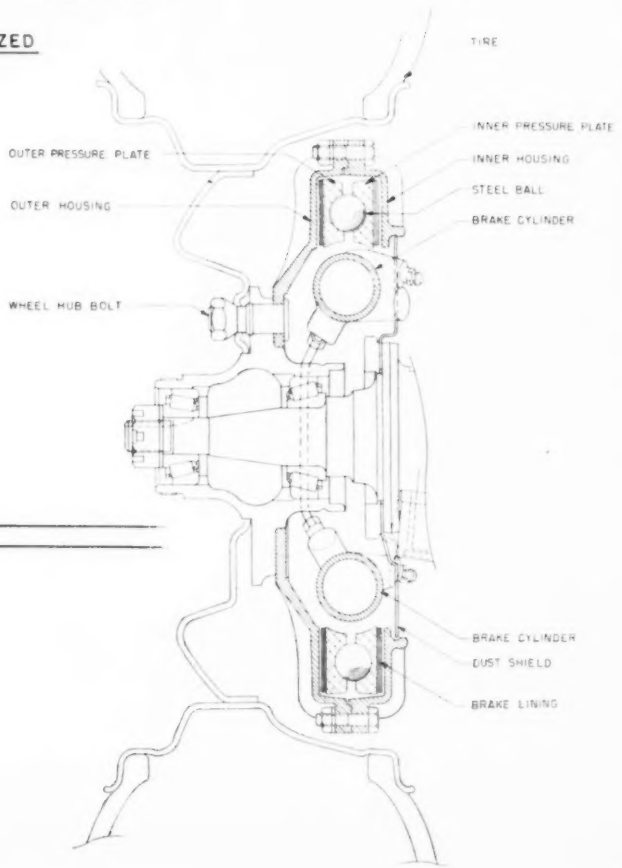


Self-Adjusting Disk Brake



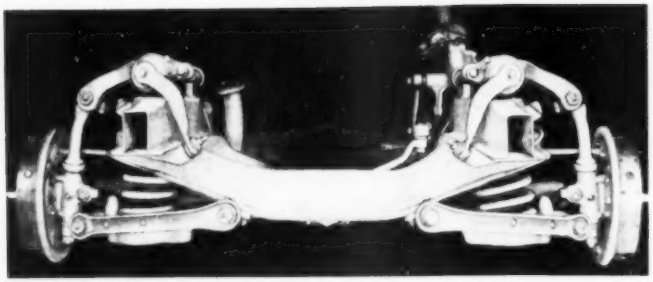
BRAKE ENERGIZED

When the outer pressure plate is rotated for brake application, six balls roll from their sockets and up onto ramps in the plates. This action increases the distance between pressure plates and brings them into contact with the inside surface of the rotating brake housing. Braking torque of the outer plate, when the car is in motion, tends to rotate this plate still farther, providing a self-energizing action.



Outer and inner housing of the Chrysler disk brake. Expansion is less than with conventional brakes as it is across the width of the housing rather than across its diameter.

Sectional view of the new disk brake.



Front view of Commander front suspension system and pitman arm connection from the steering gear.

Airfoil fenders and an airplane fuselage type hood set off by a chrome plated "spinner" are features of the 1950 styling. Shown here is the Land Cruiser. Front end appearance of the Commander is identical and the Champion front end styling is practically the same as that of the other two models.

Studebaker Models for

MAKING a bold bid for the 1950 market, the Studebaker Corp. has groomed its Champion, Commander, and Land Cruiser models with distinctive styling both outside and inside. Style-wise the new models present a frontal and overall appearance just as strikingly different as did the post-war models by comparison with other makes.

The change in eye appeal has been made by skillful tailoring of the front end sheet metal—fenders, hood, front end treatment; and by altering the form and fairing of rear fenders. The body shell itself remains unchanged.

From the standpoint of mechanical design, the big news at Studebaker is an entirely new front suspension system, embodying coil springs and providing riding comfort of exceptional character. The coil springs have unusual deflection characteristics and, in combination with new shock absorbers, are said to smooth out rough roads to an almost boulevard ride. As will be described later the steering linkage has been completely redesigned so as to provide a simple and symmetrical geometric hook-up free from backlash and responsive to the steering wheel.

In the main, the major elements of the running gear remain unchanged with the exception of the two-piece propeller shaft line which now features improved center bearing design.

Wheelbase has been upped by an inch on all models, the Champion up to 113 in., the Commander to 120 in. and the Land Cruiser to 124 in.

Coming to mechanical features, consider first the changes in the Champion chassis. Front suspension is of coil spring type, replacing the transverse leaf springs used up to now. An interesting feature of the suspension, as illustrated, is the fact that both upper and lower control arms are so pivoted as to rake to the rear about 15 deg with respect to the transverse axis. This is said to have the effect of cushioning front wheel shock on rough pavement. Another feature of the front mounting is that the coil springs are cushioned top and bottom in rubber within the tower to prevent telegraphing of shock into the chassis.

Direct acting airplane type shock absorbers are

Space in the front compartment has been increased by locating the instrument panel about four in. farther forward. The steering column and gear shift shaft of the Commander (shown) and the Land Cruiser are enclosed in an oversize steel jacket. Switches are of the push-pull type.

Grooms Its Three 1950 Buyers' Market

Features Include Entirely New Appearance, Coil Spring Independent Front Suspension, Increased Engine Horsepower and Compression Ratio, and Improved Steering Linkage

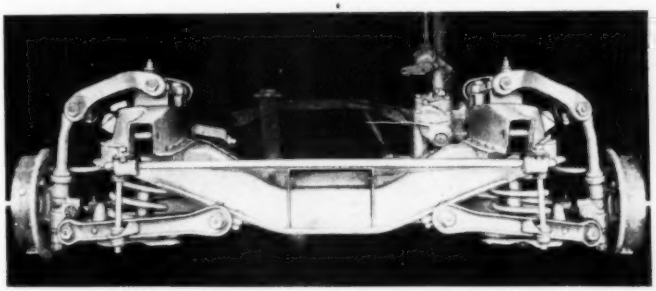
employed both front and rear in the Champion, the front shocks being mounted within the coil springs, the rear being mounted in "sea-legs" fashion, inclined inwardly at the top.

A front sway bar has been added and this has had the effect of improving stability as compared with previous models.

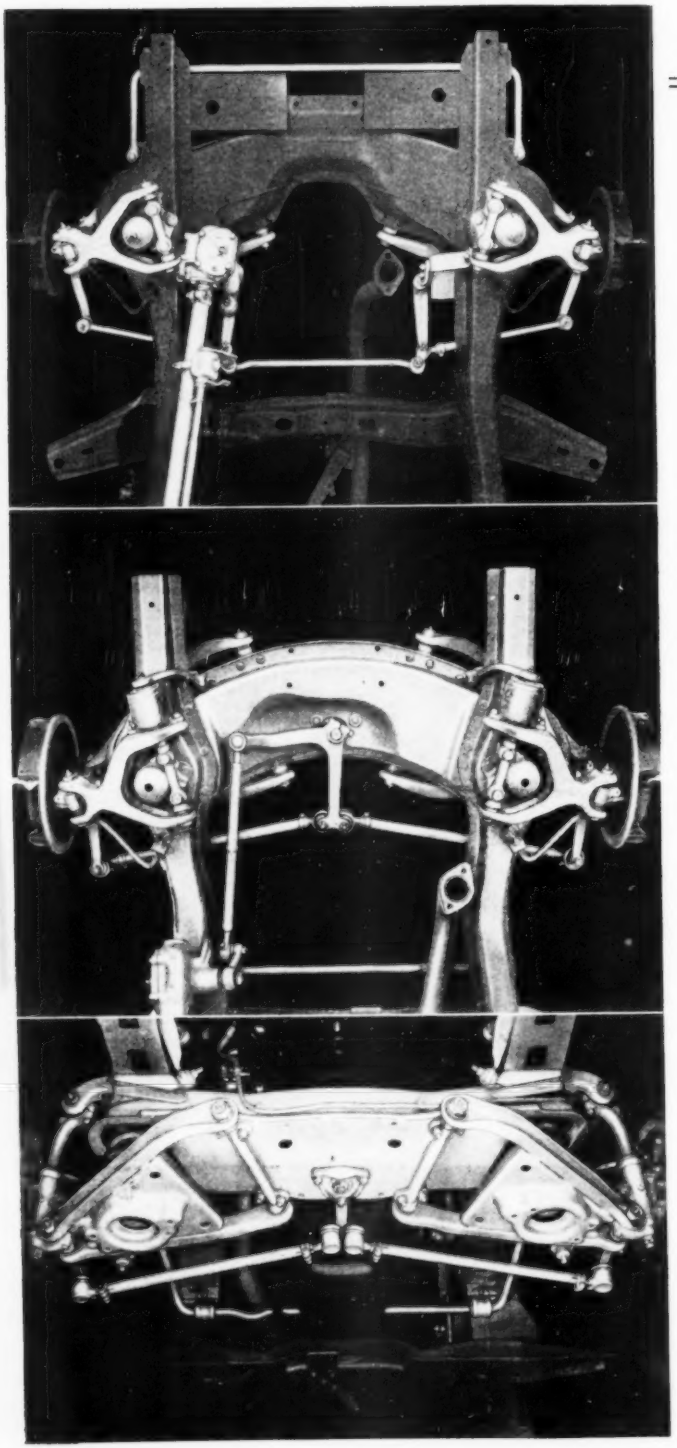
Although the steering linkage is of the same type used in previous models it should be noted that the gear has been relocated with the result that the center reach rod now is back of the engine as illustrated. While overall steering ratio is unchanged, the change in steering linkage in the new model makes for a noticeable improvement in handling and steering ease. The steering gear is of greater capacity, the Model TA 12 Ross gear being specified for the '50 models.

Front end alignment specifications remain the same except for caster. This has been made zero (0) deg. The turning radius of the car has been decreased.

An important design change has been effected in the propeller shaft support on both Champion and Commander models. As illustrated, the bearing inner race is mounted directly on the machined outer end



Front end view of Champion front suspension system, including the front sway bar installation.



of the front propeller shaft end fitting. The universal joint end for the rear propeller shaft is then splined and slip-jointed within this fitting. This arrangement has simplified the construction of the center support as well as joint ends materially, and has reduced weight as well. This is said to result in greater assurance of balance. The new design also simplifies the assembly problem on the final line since the entire joint assembly now is installed as a unit including the support member.

The Champion engine, which now has a standard compression ratio of seven to one, develops 85 hp at 4000 rpm. Its maximum torque is 138 lb ft at 2400 rpm. Compression pressure is 120 psi at 150 rpm. For high altitudes only, a compression ratio of 7.5 to one is available. Auto-Lite ignition units are standard on the Champion.

Tires remain the same—6.40-15 mounted on 5K rims—but standard inflation pressure at the front is now specified at 26 lb the rear being 24 lb.

An improvement in cooling is effected on both Champion and Commander models by the introduction of a radiator shroud. In addition, on the Commander only, the radiator core is tilted to take advantage of wind sweep.

(Top left)—Looking down on Champion chassis front end. This view shows the new coil spring front suspension in plan; also a clear view of the new steering gear arrangement with the cross link to the rear of the engine. The front stabilizer bar also is shown.

(Center)—Plan view of Commander front end showing some details of the suspension system and steering gear linkage.

(Left)—View of underside of Commander front end showing center point steering linkage, details of front end suspension, and front stabilizer bar mounting back of the engine.

Coming to the Commander chassis, the first suspenpension is of coil spring type similar in all details to that on the Champion. However, the Commander retains the double-acting Houde shock absorbers front and rear, the mounting being as illustrated, the rear mounting linkage being of "sea-legs" type. The major change in this respect is that front shock absorbers are of larger size and greater capacity than before.

The steering gear is the same as last year and front end alignment specifications are unchanged. However, the steering linkage has been changed materially, as illustrated, using a simplified center-point linkage with bellcrank. Not only is the linkage simpler mechanically but it has fewer joints and less backlash with the result that steering effect is noticably better and more responsive although no change has been made in overall ratio.

Another major improvement is the introduction of sway bars both front and rear on Commander models. This has improved road stability markedly.

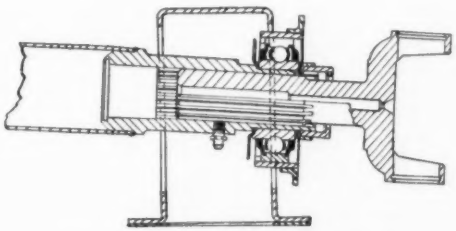
It may be noted that the rear suspension on all models remains the same as before.

The Commander engine now develops 102 hp at 3200 rpm. Its compression ratio has been raised to seven to one with an increase in compression pressure to 120 psi at 150 rpm. Maximum torque is 205 lb ft at 1200 rpm. For high altitudes, a compression ratio of 7.5 to one is available.

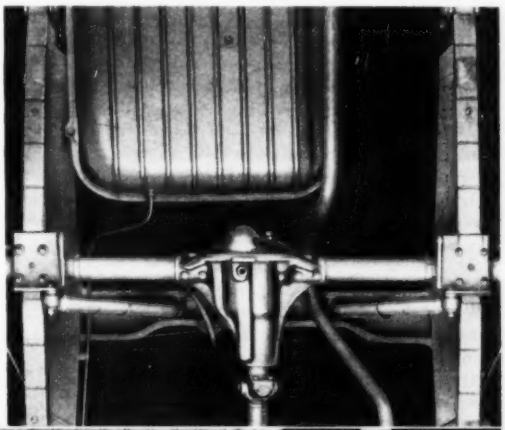
The ignition system is changed, all electrical units being supplied by Delco-Remy. Spark plugs for all models are supplied by Champion.

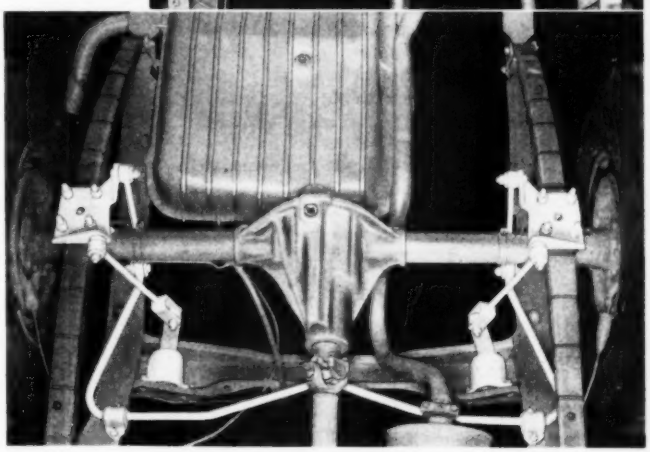
Tire size has been upped on Commander models, standard equipment being 7.60-15 mounted on 6L rims. Inflation pressure is 24 lb front, 20 lb rear.

Apart from the chassis features described above, the Land Cruiser has been given a note of advanced body framing design. To effect greater front end stability of body structure, Studebaker has introduced diagonal struts which run from the cowl downward to the front fender aprons. This serves to tie the body structure even more firmly to the chassis.



Longitudinal section of the propeller shaft support

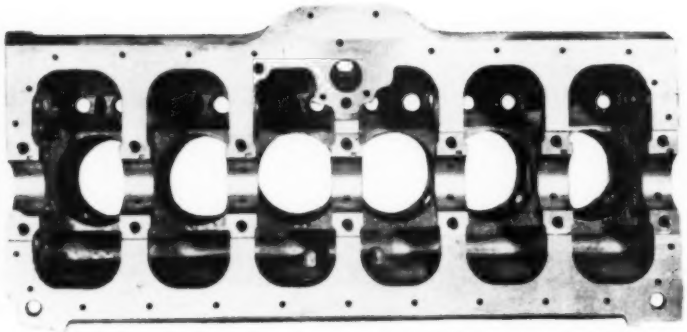




(Center)—Plan view at rear end of Champion chassis showing "sea legs" mounting of Houde direct acting shock absorbers.

(Right)—Underside view of rear end of Commander chassis showing "sea legs" mounting of Houde double acting shock absorbers at the rear; also installation of new rear stabilizer.

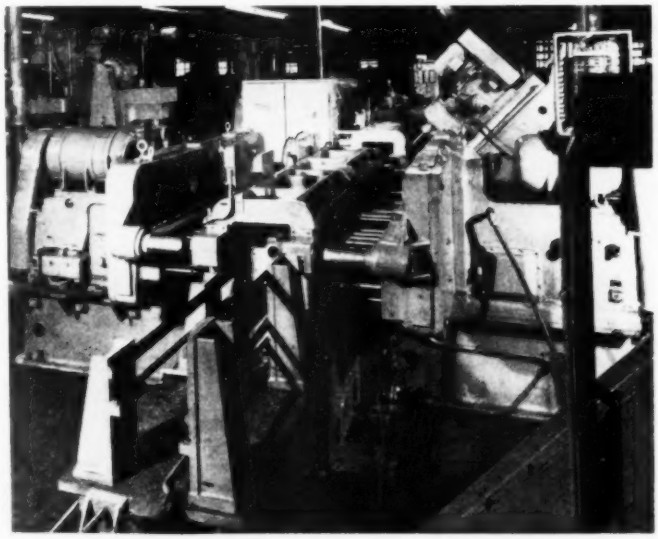
Latest Machining Methods



Bottom view of seven-main bearing cylinder block, showing bearing notches and broaching of main bearing channel.

FROM the standpoint of modernity the equipment and tooling for the new Reo Gold Comet Type OA, 331-cu in., overhead valve engine (see AUTOMOTIVE INDUSTRIES, July 1, 1949) represents the latest versions of mass production techniques developed in the automotive industries. In making an enormous investment in facilities of such advanced character, the management insisted upon machine design that would guarantee the dimensional accuracy and excellence of surface finish specified for component parts, high productivity being accepted as a matter of course. Since much of the equipment is of transfer type, the design of fixtures has been dovetailed with control elements of individual machines to safeguard accuracy and alignment as well as to protect the machine from damage.

For example, most machine tools have safety provisions that make it impossible to start the operation before the work piece is properly lined up in the fixture and securely clamped. In addition, all multiple spindle tapping machines are fitted with floating tap holders, to follow drilled holes, and automatic safety retreat spindles to eliminate breakage. Thus if a drilled hole has been missed entirely for some reason, the tap will approach the work



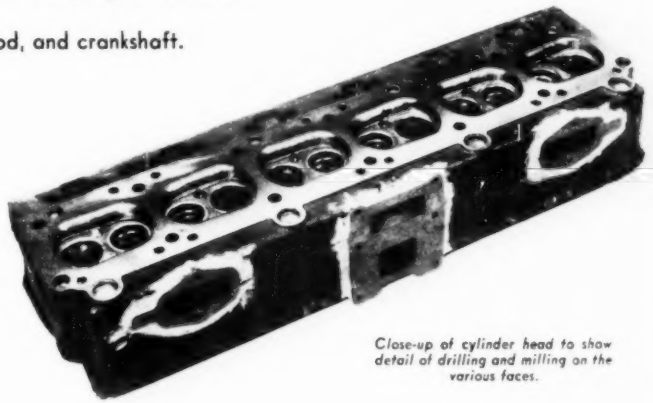
Drilling of holes in top and bottom of cylinder block is done in this large W. F. & John Barnes, 10-station drilling machine of transfer type. Feature of the machine is a built-in chip conveyor, feeding to the flight conveyor which may be seen partly in the foreground at the extreme right.

Applied to Reo Gold Comet *Engine Parts*

PART ONE

Reo's modern equipment and tooling for producing the new Gold Comet engine are described in a two-part article. Part One in this issue follows the cylinder head and block through their various machining stages, while Part Two gives a sampling of operations on the piston, connecting rod, and crankshaft.

By Joseph Geschelin



Close-up of cylinder head to show detail of drilling and milling on the various faces.

but will retract immediately if solid metal is encountered. By this means Reo has reduced the usual hazard of operating multiple spindle tapping machines and has eliminated in advance a prolific source of down time.

Because every major element of the new engine—block, head, rods, sleeves, pistons, crankshaft, etc.—has been given the benefit of special machine tool treatment, and because of the great variety of individual operations involved in a program of this kind, we have arbitrarily limited this article to a sampling of high spots. While such sampling treatment necessarily selects a small group of machine tools for comment, it should not imply that other items are not of equal importance.

Consider first the cylinder block. Since this engine is of overhead valve type, incorporating removable wet cylinder sleeves, the machining cycle is considerably simplified. The operation begins with the milling of four locating spots in a Kearney & Trecker Simplex mill, in preparation for milling in the shuttle type, special Ingersoll mill, having three stations—one for loading—and eight spindles. This machine mills the top, bottom, and bearing lock channel of the block. The operation takes place in two stages: the block is moved through the first work station in the shuttle fixture and emerges at the intermediate loading station between the two stations of the machine. At this point the block is removed automatically and held until the shuttle fixture moves back to its starting position; then a rough block and the semi-finished block are automatically loaded. The semi-finished block then passes through the second station and while the rough block is semi-finished at the same time in the first station. After completing its cycle the semi-finished and finished blocks are automatically unloaded and the table moves back to its starting position.

The second station mills and broaches the main bearing lock channel. At the end of the stroke there is short section of slab broaching tool which finishes the channel to exact width and imparts an excellent surface finish. The milling operation is exceedingly fussy, the top pan rail surface being held to a flatness of 0.004 in. Milling cutters have inserted blades tipped with a special grade of cemented-carbide. A bottom view of the finished block is shown to illustrate the main bearing channel and notching operations.

The block then goes to a special drilling machine setup in which two locating holes are drilled and reamed to provide accurate fixture location for all subsequent matching. Both ends of the block now are finish-milled in a five-spindle Ingersoll while side pads are milled in a three-spindle Ingersoll.

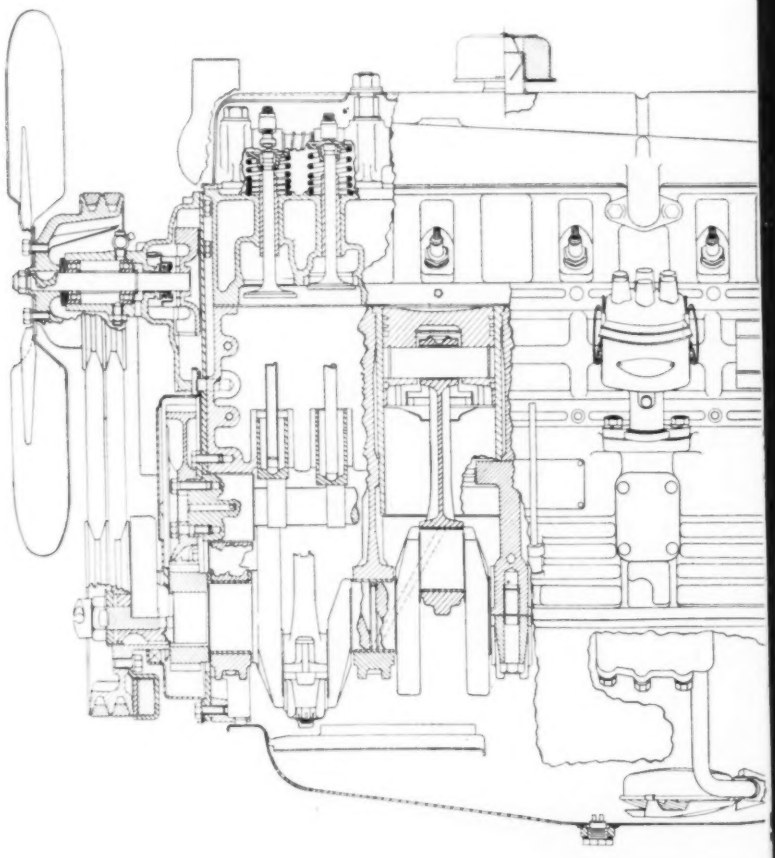
An outstanding example of modern transfer equipment is found in the Cross Transfer-matic—having five work stations—tooled for drilling holes in both ends, drilling the oil gallery in steps, and rough boring the cams and main bearing lines. Boring tools are fitted with cemented-carbide tips.

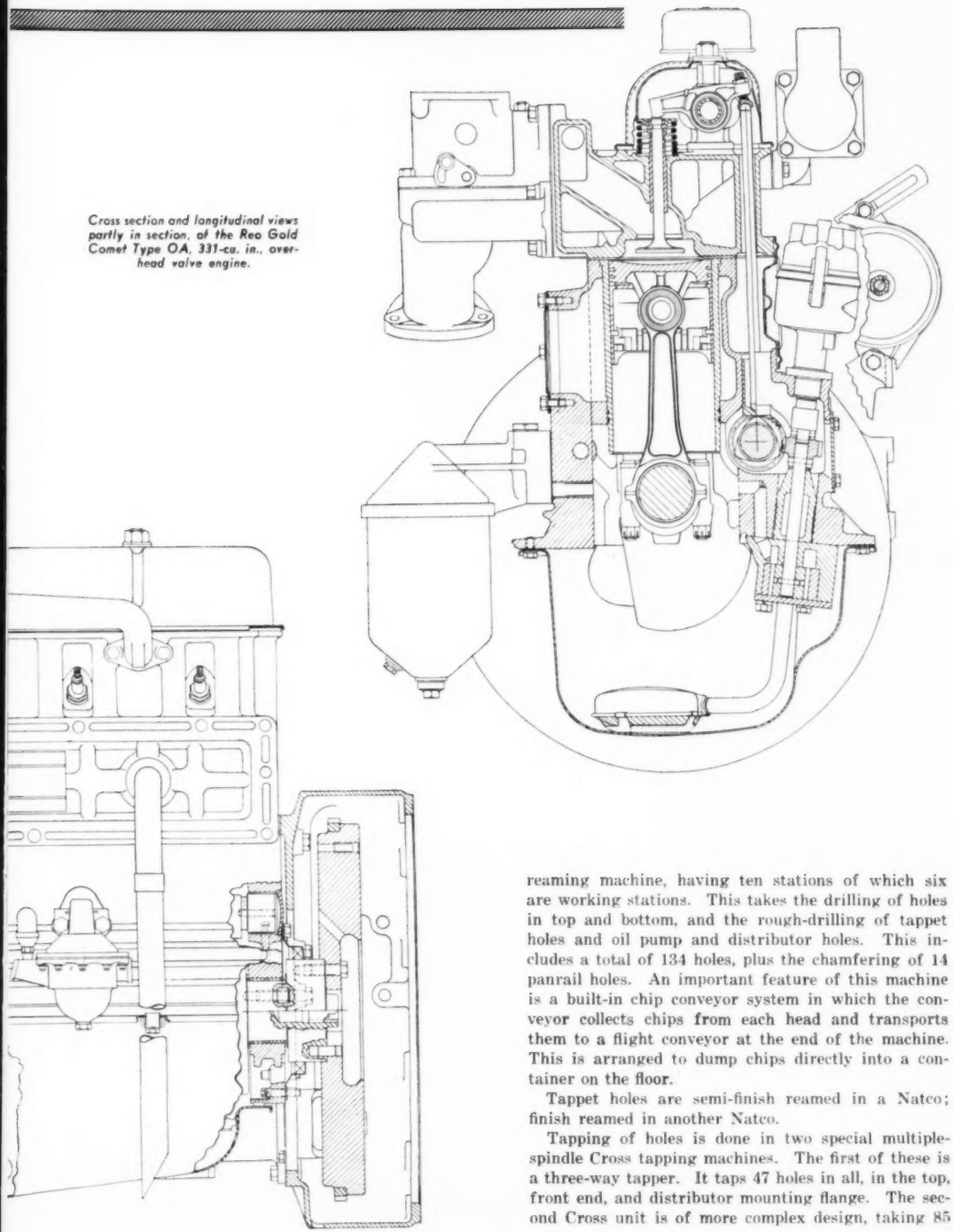
Being of seven-bearing design, the block poses a problem in the milling of main bearing insert lock notches. For this purpose, a unique form of Milwaukee mill, having two sets of heads, one on each side of the fixture, has been supplied by Kearney & Trecker. The notches are milled in one operation by means of a rocking head on one side. The opposite head, fitted with a spindle from the top and one from the bottom, mills the oil pump and distributor pads. All milling cutters are fitted with inserted blades tipped with cemented-carbide.

A two-way Natco drilling machine drills a group of 46 holes, leaving four odd holes to be drilled and reamed in a smaller Natco unit.

At this point takes place the rough-boring and chamfering of the upper and lower counterbores for the wet sleeve. This is done in a massive six-spindle Ingersoll boring machine, counterboring being held to a depth of 0.265 to 0.270 in., the upper bore being 4.656 in. diameter while the lower bore is 4.5245 in. diameter, both being held to a tolerance of 0.0025 in. Following rough boring, both sides of all seven main bearings are milled to width in an Ingersoll mill. With these heavy operations out of the way, the sleeve bores are finish-bored in another massive Ingersoll six-spindle boring machine.

Next in line is another of the big transfer machines —the W. F. & John Barnes progress drilling and



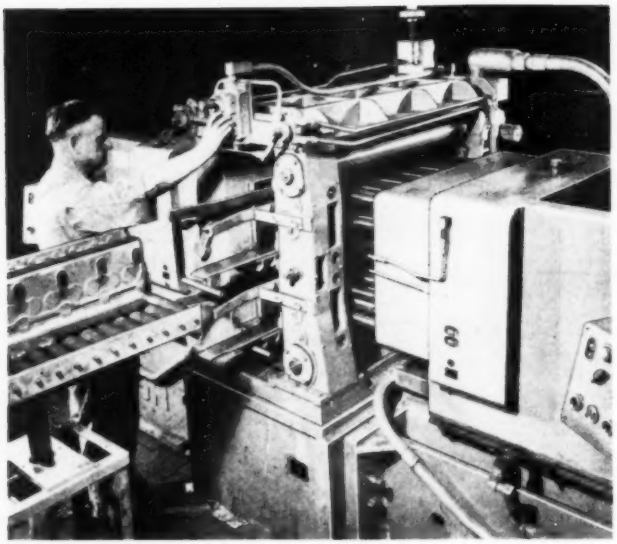


Cross section and longitudinal views partly in section, of the Reo Gold Comet Type OA, 331-cu. in., overhead valve engine.

reaming machine, having ten stations of which six are working stations. This takes the drilling of holes in top and bottom, and the rough-drilling of tappet holes and oil pump and distributor holes. This includes a total of 134 holes, plus the chamfering of 14 panrail holes. An important feature of this machine is a built-in chip conveyor system in which the conveyor collects chips from each head and transports them to a flight conveyor at the end of the machine. This is arranged to dump chips directly into a container on the floor.

Tappet holes are semi-finish reamed in a Natco; finish reamed in another Natco.

Tapping of holes is done in two special multiple-spindle Cross tapping machines. The first of these is a three-way tapper. It taps 47 holes in all, in the top, front end, and distributor mounting flange. The second Cross unit is of more complex design, taking 85



Close-up of one of the two-way, two-station, over-and-under type, Baush multiple drilling machines. The air-operated elevator mentioned in the text may be seen at the left. It is used for loading and unloading the upper station as shown; also to transfer heads to the companion machine on the other side.

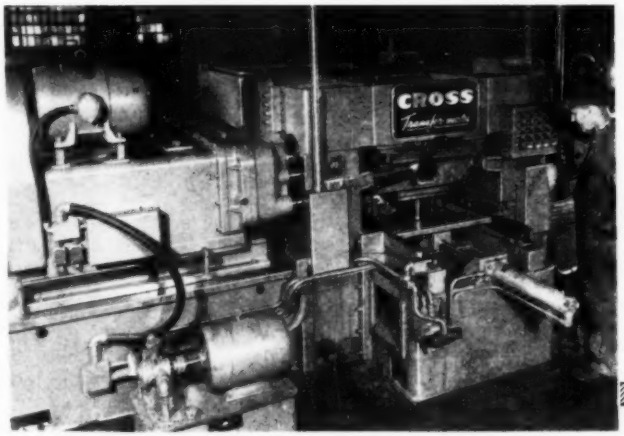
holes in the bottom, right side, rear face, and front face. Because of the close spacing of these holes, tapping has to be done in two stages and the machine, which is of four-way type, has two separate stations served by a shuttle fixture. One station takes a group of holes with ample clearance for the spindles, the second station takes the remaining holes. Both machines are fitted with floating tap holders and safety retreat spindles.

After a washing operation the main bearing caps are assembled. The block now goes into the final finishing operation. The first machine, a Natco, semi-finishes the crank holes and the distributor and oil pump holes and semi-finishes and finishes the camshaft holes. Next the cam bearings are assembled. Then another Natco machine finishes the cam and crank holes, distributor and oil pump holes and reams the dowel holes in rear for the flywheel housing and the dowel holes in front for the gear cover.

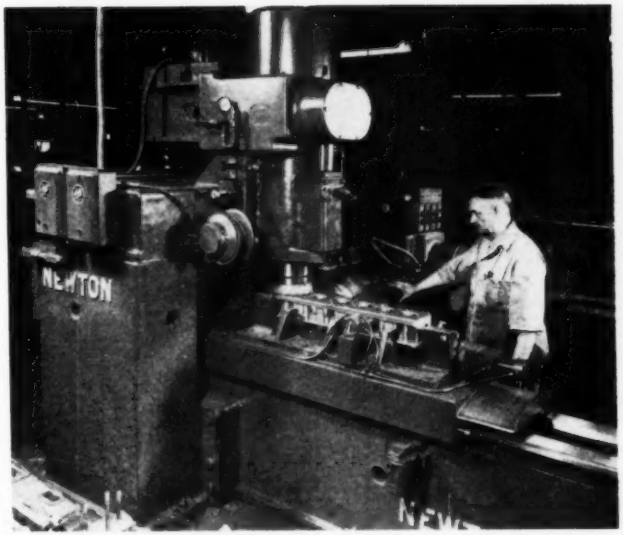
Major operations on the cylinder head start with the milling of the four faces in two special Newton mills, one being illustrated here. The first machine finish-mills the top face and spark plug side. Here the fixture ture is arranged to align the casting accurately from points in the combustion chambers. The second Newton mill does the semi-finish-mill of the gasket surface and manifold side, these surfaces being finish-milled at the very end of the machine line. A view of the finished cylinder head is shown to illustrate the variety of holes in the valve and manifold sides.

Next follow some radial drilling operations taking a number of odd holes, and including drilling and reaming of two locator holes for indexing in all subsequent fixtures.

Now we come to a group of four interesting Baush drilling machines, one of which is illustrated. They are over-and-under type machines, having a lower and



View looking into the loading end of the big Cross Transfer-matic machine which has three working stations. The machine combines in one cycle the drilling of holes in both ends, step-by-step drilling of the oil gallery, and boring of cam and crank lines in the cylinder block.



One of the two heavy duty Newton mills on the cylinder head. Each machine takes one face and a side.

upper station for compactness. Between pairs of machines, in the aisle, is an air elevator station, serving the dual purpose of raising work to the upper station as well as moving heads from one machine to another. It is a very simple and economical loading and unloading device, indicating considerable study and planning.

The first two machines drill substantially the same faces, two machines being provided because of the close spacing of holes and the need for adequate spindle clearance. Operations in these machines are as follows:

First Machine. Upper Station

Top side: Drill 12 pushrod holes half-way through. Drill 12 valve guide holes through.

Bottom Side: Drill 12 stud holes half-way through. Counterbore three intake valve seats. Core drill two outer clean-out holes. Counterbore three exhaust valve seats.

Lower Station

Top Side: Counterbore 12 valve spring washer seats. Drill 14 stud holes.

Bottom side: Drill 12 pushrod holes through. Core drill two center clean-out holes. Ream two outer clean-out holes. Counterbore three exhaust valve seats.

Second Machine. Upper Station

Bottom Side: Semi-finish ream 12 valve guide holes. Ream two center clean-out holes. Drill 14 water deflector holes.

Lower Station

Bottom Side: Semi-finish counterbore six exhaust insert counterbores. Drill 14 water deflector holes.

Top Side: Core drill five clean-out holes for pipe tap.

The third of the two-way, two-station Baush drills is primarily for the spark plug side of the head. It drills six spark plug holes at the upper station; and 10 holes on the manifold side, and 14 holes on the spark plug side at the lower station. The fourth unit is a one-way, two-station machine, counterboring six spark plug holes at the upper station; countersinking at the lower station, all holes to be tapped.

A five-way Baush tapper backs up the preceding drilling operations, tapping all holes in manifold side, spark plug side, top side, and spark plug holes. This tapper handles 35 holes and is fitted with floating

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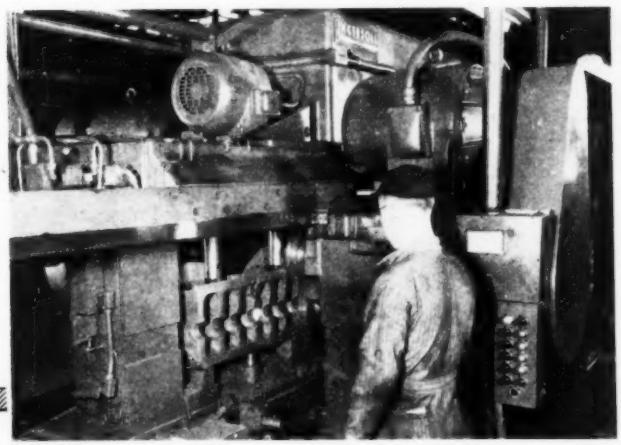
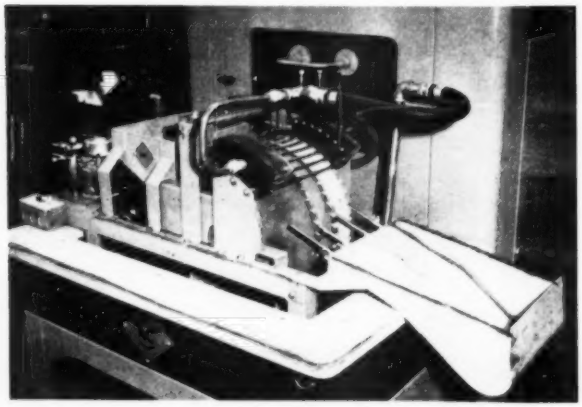


Big Ingersoll two-station milling machine for cylinder blocks, first station being shown here. The partly milled block is removed from the fixture at the next station—to the right.

Increasing

By John Evans
Electronics Section,
The Allis-Chalmers Mfg. Co.
Milwaukee, Wis.

Above—A semi-automatic fixture, installed at an automotive parts plant, induction anneals automobile brake arms at the rate of 2400 per hour. The section annealed is that shown beneath the right hand of the operator as he loads the fixture.



Left—Valve lifter rods are through hardened on both ends by means of this automatic fixture at a rate of 3600 per hour.

SEVERAL recent applications by automobile and automotive parts manufacturers show that electronic induction heaters are becoming vitally important tools. Since the majority of possible uses concern steel processing, the automotive industries with their essential production line setups can make maximum use of induction heating advantages. This holds true whether the process is heating, hardening, annealing, brazing, soldering, or any of the other applications.

A large automotive manufacturer has increased the inherent benefits of induction heating by use of an automatic work fixture designed to speed rocker arm shaft hardening. Both the work table and the 20-kw induction heater shown in illustration, are used to harden eight separate areas on the rocker arm shaft. In addition, the same concern has three similarly rated heaters for several other applications, such as hardening the ends of valve lifter rods.

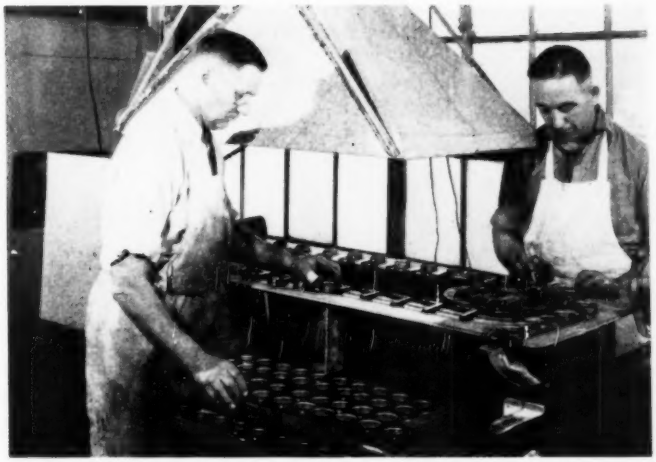
Shafts hardened one a minute

This particular rocker arm shaft measures about $17\frac{1}{4}$ in. in length, with internal and external diameters of 17/32 and 13/16 in., respectively. Areas to be hardened are $1\frac{3}{4}$ in. long, contain a small oil hole and slot, and are hardened to Rockwell 55c or better with a case depth of 0.020 in. Required heating time is two seconds with a 3.5 second quench. Because of the short selective heating, hardening operation is devoid of objectionable scale or warpage, with rejects reduced to a negligible minimum or eliminated. During the

Output of

Induction Hardened Parts

with Automatic Work Fixtures



Left — A soldering application of oil gages by induction heating on a production line basis.

first of the two-second heating time, the induction heater transmits over 30 kw of power producing a high power density which gives a uniform and shallow case hardness pattern.

Shafts to be hardened are placed on the inclined rack just above the control panel and the completed shafts slide off the incline into a work bin to the left. When only three or four shafts remain to be hardened, a signal is activated to indicate that more shafts should be placed on the incline. No handling is required during the hardening process itself.

Human element minimized

After the induction heater has been turned on, the work fixture is brought to its proper operation sequence by push-button control. Pushing another button activates an air-cylinder which reaches back and pulls a shaft from the bottom of the inclined rack so that it slides to the second incline. The shaft with the adjustable fingers is attached to the work table and is synchronized with the unit so that the rocker arm shaft will strike the first finger and stop before entering the work coil. Pressing another button causes the first finger to turn away slightly and permit the shaft to slide into the work coil and stop at the second finger. This and the following seven

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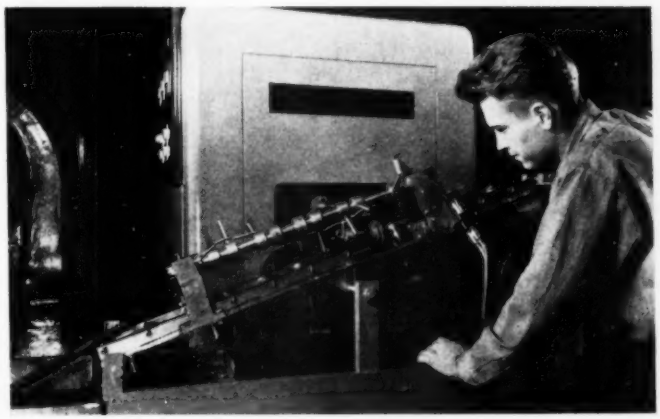


Right—an induction hardening process to harden rocker arm shafts for automotive use. The work fixture is fully automatic and hardens eight areas on each shaft to specifications at the rate of one shaft per minute.

Turn-Milling *at High*

Cadillac Machines Crank Pins, Main Bearing Journals, Cheeks and Counterweights on Latest Equipment

WHEN Cadillac engineers developed the new Cadillac Motor Car Division's high compression V-type engine, factors affecting production costs were given most careful study both by the engineers and by executives concerned with production. A case in point is the machining of the crankshaft.

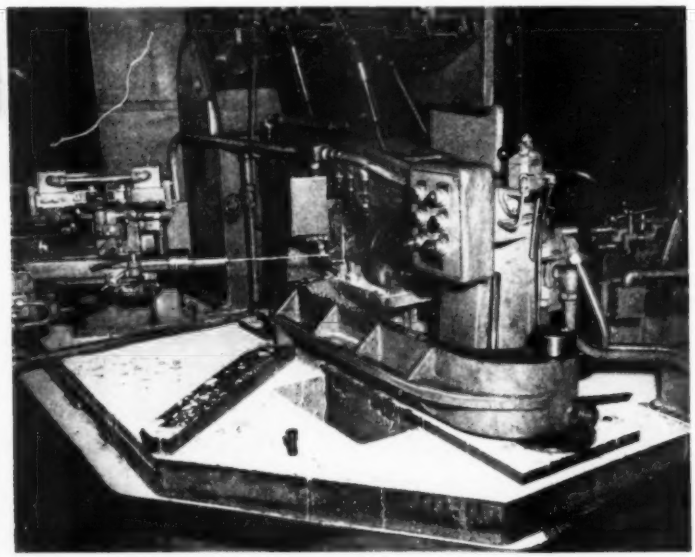
This crankshaft is forged from SAE 1145 steel and has, of course, integral counterweights. Heat-treatment, completed before any machining is done, gives the shaft 229-265 Br. hardness. The engine has five main bearings, yet the crankshaft is so short that unusual rigidity, including high resistance to torsional deflection is attained. Use of a short shaft helps to keep the engine short and compact and thereby effects a substantial saving in material, not only in the engine as a whole but in the crankshaft itself. Naturally, this has a favorable effect upon costs.

When machining costs of the crankshaft were considered, it had long been known that roughing operations are of great importance. Considerable metal has to be removed from journals, pins and cheeks and, to date, such operations had been slow, largely because the crankshaft lathes commonly employed depend upon the use of single-point tools. These tools do not cut so rapidly as is desirable and they require more frequent grinding, and resetting than is most economical.

To reduce roughing time, it was logically argued that, if milling cutters, instead of single-point tools, could be employed, much faster roughing rates could be attained. This, of course, would require a radically different type of machine and Cadillac's efforts to interest crankshaft lathe builders in supplying such radically new machines were not fruitful.

Ultimately Cadillac persuaded Gisholt Machine Co. to undertake, with Cadillac assistance, the development of two entirely new machines that are appropriately termed "Turn-Mills" because they employ milling cutters but still do turning jobs. Valuable assistance was also supplied by Goddard & Goddard in the development of the special heavy inserted carbide blade milling cutters needed.

Naturally, the simpler of the two machines is that employed for turn milling four of the five main bearing journals. The center main bearing journal, the sprocket flange and the oil slinger diameter are previously turned in a Wickes center

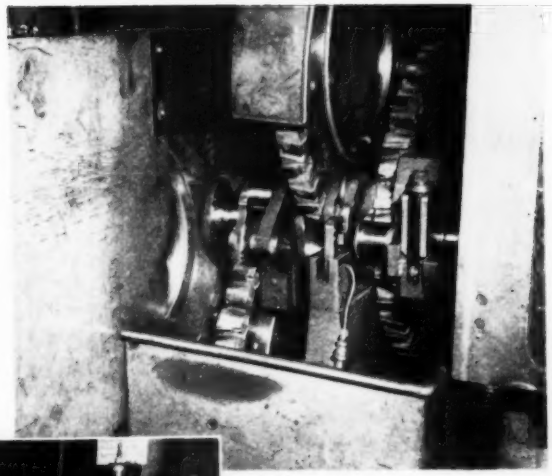


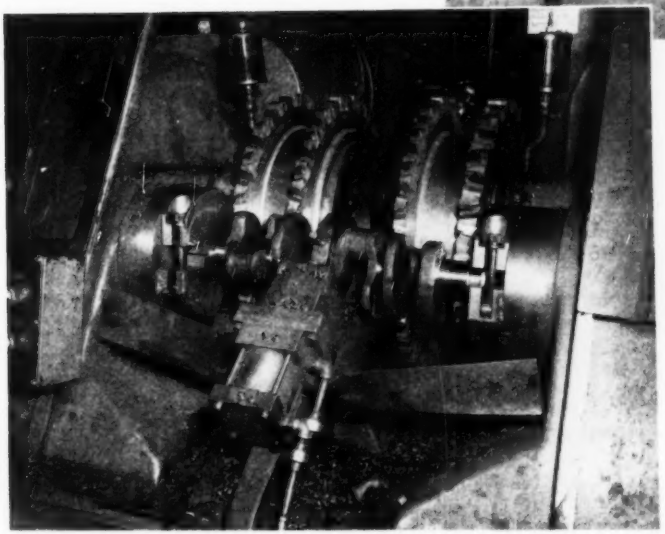
(Left)—One of the four Avey machines that drill holes at various angles in the crankshaft. Each drill chuck is set for a given maximum torque which, if attained, causes the drill to back out, avoiding drill breakage.

Crankshafts

Production Rates

By Herbert Chase





(Above)—Gisholt Turn Mill in which each of the four milling cutters is mounted on a slide that permits the cutter heads to reciprocate, two horizontally and two vertically, as crank pins are turned following the infeed in which cheeks are faced.

(Left)—Closeup showing the four inserted carbide blade cutters of the Gisholt Turn Mill at the end of the operation in which four main bearing journals and adjacent cheeks are roughed in a single fast operation.

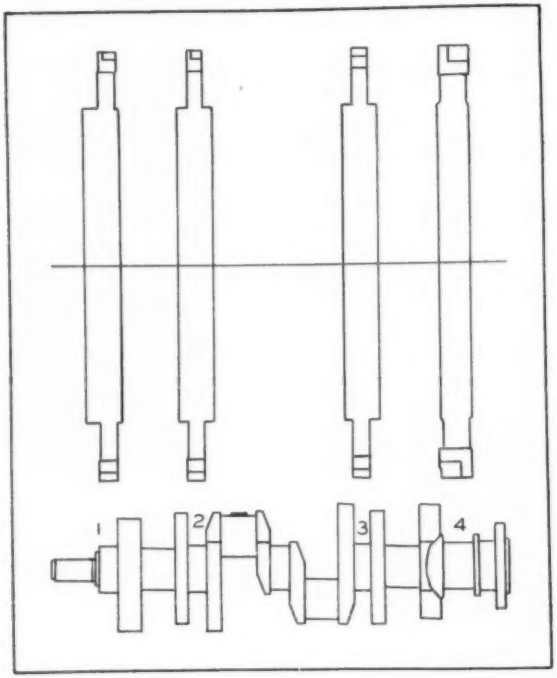
drive lathe partly to establish locating surfaces for subsequent operations and to permit later use of a steady rest at the center main bearing journal.

In both sets of turn milling operations, the cutters first feed in to depth and in so doing face the cheeks of crank throws. At the instant that full depth is reached, the shaft must start to rotate and continue rotation until the turning operation is completed. Exceedingly close timing is essential because, if the cutters turn idle against the work at any point, there is a tendency to rapid dulling and if rotation of the shaft starts too soon, damage to cutters results.

The cutters are 24 in. in diameter and have 42 or 36 blades staggered to cut right and left alternately, for the four main bearing journals as shown in the illustration. The two cutters at the left are on one spindle and overhang the spindle bearing at that side. The other two cutters are on a separate spindle, in line with the first. Both overhang the bearing of their respective spindles. By having a divided instead of a through shaft, cutters can be changed readily without disturbing the spindle bearings.

These spindle bearings are of sleeve type and fit shafts of 5^{3}_{4}-in. dia. It has been found essential to provide for utmost rigidity both in the machine and in the cutters. In addition, all blacklash in driving gears had to be eliminated. If these conditions were not fulfilled, cutter breakage became serious. Flywheels weighing 500 lb are used on spindles to substantially eliminate variations in angular velocity of the cutters. It has also been found necessary to employ climb milling, as no success was attained when cutters turned in the opposite direction.

Transition from in-feed, without crankshaft rotation to turn-feed (shaft rotating) termed "blending" is precisely timed. All cutters must be set to synchronize in cutting. This setting is facilitated by lights that are arranged to flash at the instant of transition from in-cutting to turn-cutting. Driving motors are provided with indicating watt meters



(Above)—Diagram of the cutter arrangement for turn milling four of the five main crankshaft journals. Cutters are staggered and face cheeks at both sides besides turning the journals themselves.

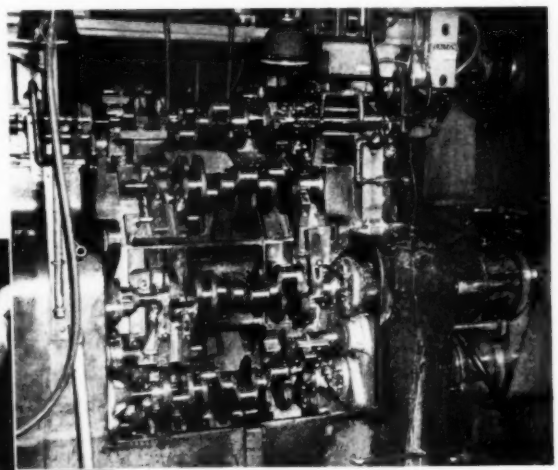
which show power input and, if this input exceeds a predetermined value, the machine is stopped to find the cause such, for example, as dull cutters. In general, excessive power consumption is thus a signal that cutters need to be changed.

As cutters are large and quite expensive, factors affecting cutter breakage have to be given close attention and the conditions mentioned were not all learned without penalties in breakage. Individual cutter blades in use at present are of K2S Kennametal or CA51 Carmet. These grades give about equal results but experiments with other grades are continuing.

Initially, on the machine for main bearing journals, regrinding was required after about 50 crankshafts were machined. At present, the run between grinds has been extended to the range of 298-382. The corresponding figure for cutters doing crank pins is 190-319 per grind.

At present, the in-feed, down cheeks of the cranks, is between 9½ to 10 ipm. Time for rotation of the shaft in the turning cut is about 1.28 min, equivalent to a feed of about 5 ipm. The surface speed of cutters is 408 fpm.

Floor-to-floor time per shaft on main bear-

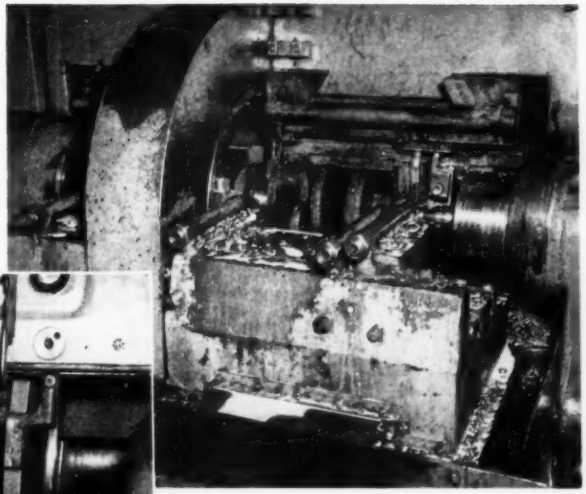


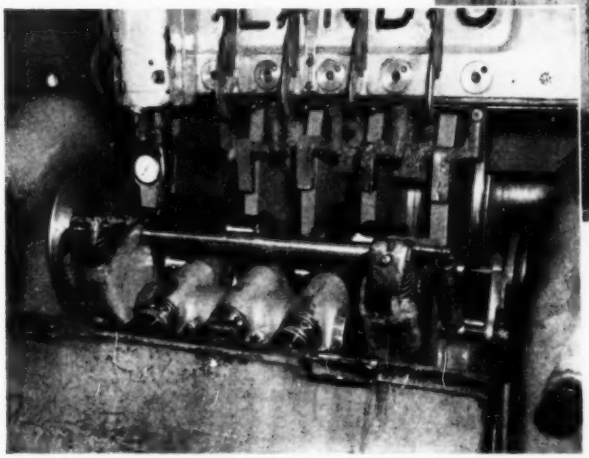
(Above)—In this Baker drilling machine, equipped with a fixture that indexes the crankshaft through eight working stations, all holes parallel to the axis are drilled and some are counterbored, reamed and tapped.

(Left)—Setup for grinding one of the turn milling cutters in an Oliver machine.

(Right)—In this Wickes lathe setup, the center main bearing journal, and the flange and oil slinger diameters are roughed with single-point tools, partly for location in subsequent operations.

(Below)—Setup in the five-wheel Landis grinder that sizes all main bearing journals in a single setting while hydraulic steadyrests apply sufficient pressure to counteract deflection that might result otherwise from the pressure applied by the wheels.





ing journals is 2.8 min and on crank pins about 3½ min. On this basis, the rate for roughing four main bearing journals is better than 20 shafts per hour but is somewhat less if one man tends two machines. The corresponding rate on four pins is about 17 shafts per hour. These rates naturally represent a great advance over conventional crankshaft machining with single-point tools.

Since, in turn milling, both the cutting tools and the shaft rotate (and at greatly different speeds), the surfaces generated are not true cylinders but may be likened to series of facets each of which is only a few thousandths of an inch wide, the facets being disposed around the diameter of each journal and each crankpin. It was thought possible that, in grinding, these facets might result in chatter and perhaps have other detrimental effects. Quite the reverse has proved to be true. Apparently the facets help to clear the grinding wheels and both a better and a faster grind results, wheel life also being increased.

Grinding is also favorably affected by ability to hold spacing and radii in corners within closer limits than in turning with single point tools, hence less metal is removed in grinding, than with prior turning methods.

Cutter grinding is a factor that required consideration but it is handled readily on an Oliver grinder. In this machine, the cutter is mounted on a pivot and is indexed around as grinding proceeds. A green grit grinding wheel is employed. It is reciprocated and mounted on a support that rocks on trunnions under the influence of a follower that keeps in contact with a master cam ground to make the wheel follow the grinding contour specified. With this setup it is not difficult to insure proper cutter grinding even without a highly skilled operator.

Questions concerning rake and other cutter angles have been the subject of considerable study. Cutting edges make a 10-deg angle with the axis of rotation but are dubbed to neutral at the rounded corner that cuts the fillet radius. Radial rake is five deg negative. Peripheral clearance is five deg and side clearance three deg.

As the cutters consume much power in making their rather deep cuts on hard steel, considerable heat is generated. As in other negative rake milling, however, both the cutters and the work remain relatively cool. Actually, the heat goes chiefly into the chips which come off at a rather high temperature. Some sparking occurs at tools as in other negative rake milling. No coolant is used.

On the Turn-Mill for main bearing journals, it is necessary only to feed the cutters to depth with the crankshaft fixed and then turn the shaft 360 deg while journal diameters are machined. The shaft is rigidly clamped in a chuck at each end and is supported in an air-champing steady rest on the center main bearing.

In the Turn-Mill for the four crank pins, however, there are four cutters each mounted on its own spindle which, in turn, is supported on a slide. Again the crankshaft is clamped in a chuck at each end and has a steady rest on the center main bearing journal. Of the four cutters, one feeds in from the back, one from the front, one upward from below the crankshaft and

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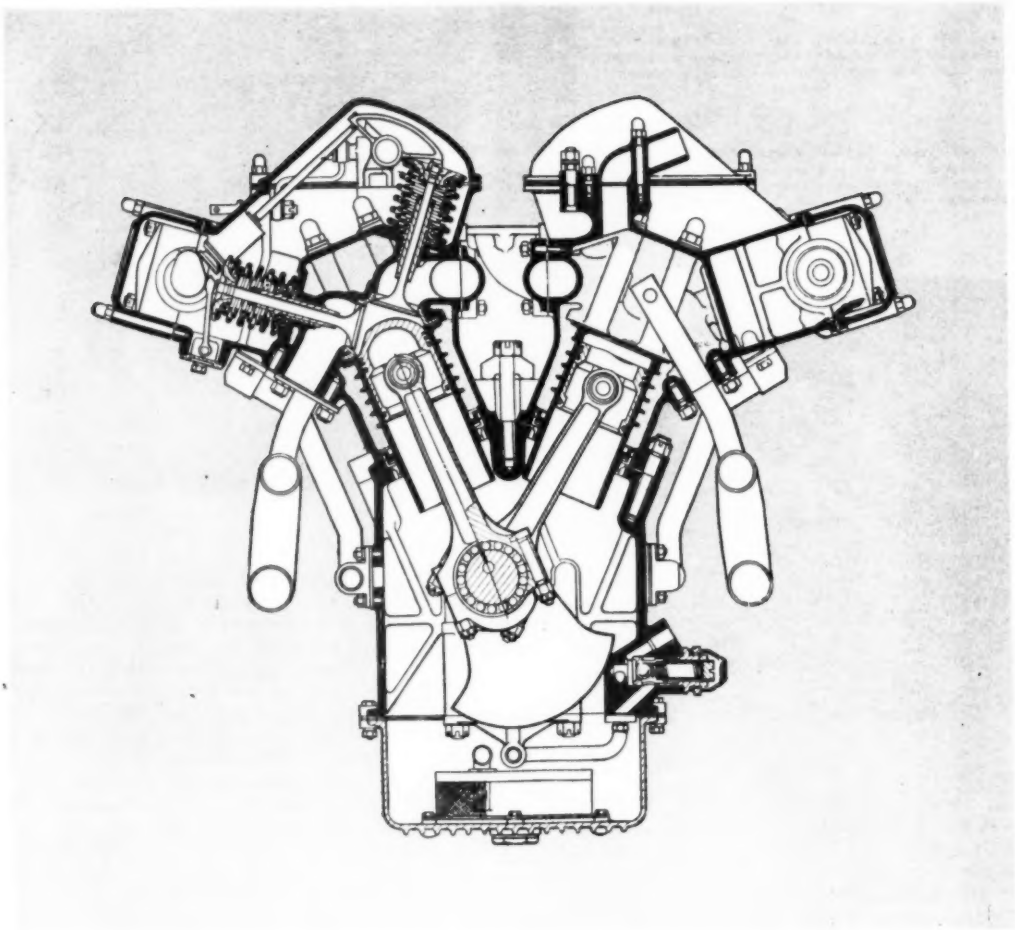

Cross section of 16-cylinder Talbot Grand Prix race engine. Courtesy of The Autocar, London.

Talbot 16-Cylinder Grand Prix Engine

THE French Talbot 16-cylinder, 91.5 cu in. supercharged engine which is being prepared for Grand Prix racing incorporates many unique features of construction. The two cylinder blocks, integral with the head, are light alloy castings. An aluminum bronze casting cast as part of the head, forms the combustion chamber, including valve seats and spark plug boss. Hardened cylinder liners are screwed into the aluminum bronze of the heads. A gland near the bottom of the liner seals against leakage of coolant.

One camshaft is carried at the side of each head, operating the exhaust valves through rockers between the cams and valves to take side thrust, with push rod operation of the intake valves. Camshafts are driven by a train of gears at the front end of the engine. A magneto and two-stage Roots type superchargers also are driven by these gears.

Rollers are used both for the connecting rod and main bearings. Cylinder blocks are staggered, with connecting rods for opposing cylinders side-by-side on a single crank pin.

Air Conditioning of Cars Presents Challenge to Designers

By Joseph Geschelin

THE vagaries of the weather being what they are, the problem of hot weather comfort has become almost as acute in the northern belt of the USA as it has been in the southwest in past years. To many people this has renewed interest in the air conditioning of automobiles, recalling intensive efforts along this line on the part of a number of manufacturers of refrigeration equipment before the war.

Whether or not complete mechanical refrigeration is the answer remains a matter for conjecture at this writing considering the extremely high cost of a mechanically sound factory installation. From an engineering standpoint the problem is not insuperable since the equipment can be quite similar to that used in many modern buses. On the other hand the ratio of cost of air conditioning equipment to total price of the vehicle is considerably higher for motor cars than for buses.

Air conditioning was offered as optional equipment in Packard cars prior to the war. Despite its high cost, the application was successful and welcomed by a large group of car owners particularly those in the southwest.

At least two manufacturers are interested in promoting air conditioning provided they get some encouragement from motor car engineers. One of these is said to be doing some experimental work with a high priced car producer. This company is developing a modernized version of a system built to order in small quantities before the war. They propose to have all of the equipment mounted under the hood, discharging air against the windshield, then back into the car. This arrangement will make use of existing blower equipment and ducts. It will be so designed as to use fresh air only.

This company contends that in cars of current design the greatly increased glass area, together with the requirement of using fresh air only, demand an air conditioning system of greater capacity than previously. For this reason they discount the practicability of an all-electric unit. They claim power requirements will be too high and that size and cost might be prohibitive. They feel the same way about the possibilities of a heat-operated absorption system.

On the other hand, Keco Industries, Inc., Cincinnati, Ohio, has been producing motor car air conditioning equipment of electric refrigeration type for the past three years. They have a line of bus air conditioning equipment as well, the principal customer being the Flexible Co. The motor car system was developed originally for ambulance chasses and was later extended to other commercial units such as armored cars and to some passenger cars. It is claimed that modifications of this equipment now make it possible to equip most standard chasses.

Keco motor car equipment employs a self contained air conditioner. The unit has a refrigerating capacity between $\frac{1}{2}$ and $\frac{3}{4}$ ton, depending upon conditions, and is considered ample for an automobile if the body is suitably insulated and fitted with heat absorbing safety glass.

The Keco unit requires an electrical supply of approximately 900 watts obtained from a generator and regulator of the company's own design and make. It is used in conjunction with additional storage batteries, wiring harness, control panel, and other accessories required for each make of car. Generator capacity of the current model is 1000-watt but they would like to see a larger generator to take care of idling and low speed operation.

For the average car, the Keco equipment described above will have a list price of $915. The retail selling price, including installation and the fitting of special insulation and special glass, runs between $1250 and $1750 under present conditions.

However, if there were prospects of greater interest on the part of motor car engineers and consequently some promise of volume production, cost could be reduced materially. For example, Keco believes its part

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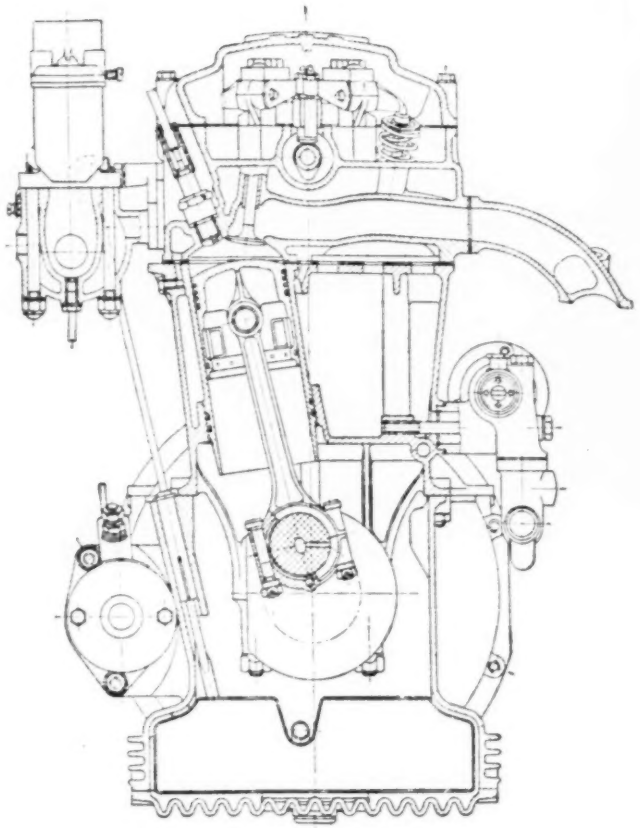
Redesigned Lancia V-4 Has Wet Cylinder Liners



Transverse section of redesigned Lancia engine. The engine is used to power the latest Italian third series Lancia Ardea which now has five forward speed ratios. (Drawing from The Motor, London).

REDESIGNED to incorporate renewable wet cylinder liners, the 55.14 cu in. third series Lancia Ardea engine is of compact narrow angle V-4 construction. In contrast to more orthodox wide-angle V engines, the narrow V layout enables a single overhead camshaft to actuate all valves without pushrods being needed. The camshaft is driven from the crankshaft by a duplex roller chain. The two valves in each cylinder are inclined fore and aft, to allow room for the spark plug, set near the center of the compact combustion chamber which approaches hemispherical form.

The latest design three-bearing crankshaft has been stiffened by an increase in the diameter of the crank pins. Forged steel connecting rods supersede the aluminum alloy type used previously. Each crank throw incorporates a plugged passage serving as a centrifugal sludge trap, a provision which supplements the built-in full flow oil filter. With a bore and stroke of 2.56 in. and 2.68 in., respectively, the engine develops 28.5 hp at 4600 rpm. The compression ratio is 6.0 to 1.

BOOKS ...

CONVEYORS AND RELATED EQUIPMENT (Second Edition), by *Wilbur G. Hudson*, 468 pp.; publisher, *John Wiley & Sons*.

In this revised edition the author presents an interesting review of the science of handling materials, provides a guide to the engineering factors to be considered in buying, equipping, operating and maintaining conveyors and other types of materials handling devices. New material in the second edition includes a chapter on industrial trucks and their selection; extended design data on pneumatic conveyors, said to be rare in the literature; disclosure of recent developments in belt conveyors; and a discussion of dust explosion hazards based on Bureau of Mines investigations. Among the topics covered in this book are: screw conveyors, bucket elevators, skip hoists, belt conveyors, pneumatic and hydraulic conveyors, aerial tramways, weighing, car unloading, chains and drives, flight and apron conveyors, some problems and their solution.

NEW

Production and Plant

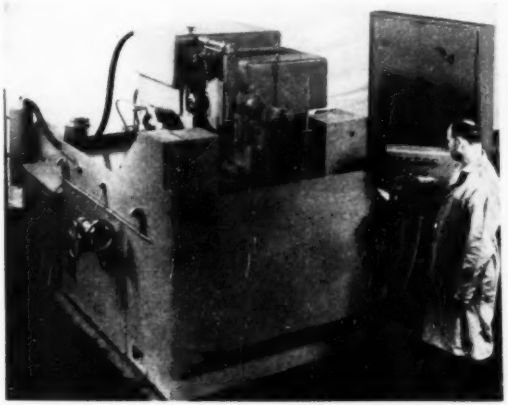
EQUIPMENT

For additional information please use coupon on page 58

E-30—High Production Contour Grinder

Developed by the Thompson Grinder Co., Springfield, Ohio, is a new Truformatic crush grinding machine for the mass-production of simple or intricate contours in small metal parts. The machine illustrated produces convex and concave finished edges on lock stampings at the rate of over 65 per min.

The fixtures are loaded with about 160 stampings and then loaded onto the indexing table which has two vertical faces for fixtures. The table turns 180 deg and the work is brought into position for grinding. Simultaneously, on the other side of the rotating table, the fixture with the finished work is ready for unloading and refilling.

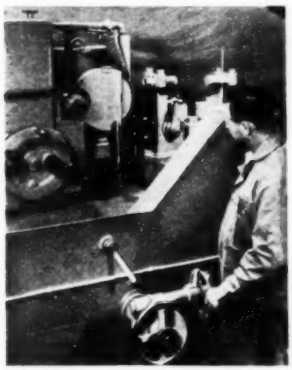


Thompson Truformatic grinder showing compact enclosed design and pushbutton controls initiating completely automatic operation.

Illustration of the side of the Thompson Truformatic shows how the work in the fixture is brought into contact with the grinding wheel. This operation after the original setting is entirely automatic with pushbutton control of the entire working cycle. The Truformatic wheel head moves in horizontally to contact with the work on the table; and the indexing table rises to preset stroke. The work is ground in a single pass as the form is transferred from the wheel and ground into the metal parts. Worktable stroke is variable from 3 to 16 in. at any feed rate up to 15 feet per min.

The wheel head then retracts and the table returns to loading height and indexes ready for the cycle to repeat. Truformatic finishes 160 parts a cycle with about 25 cycles being completed each hr. Production thus is about 4000 parts per hr.

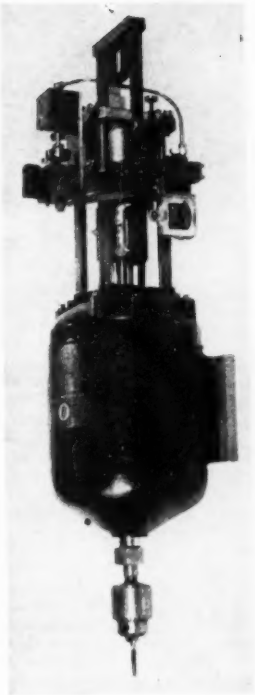
Thompson Truformatic Grinders are available, too, in sizes and capacities to meet various mass-production requirements.



Thompson Truformatic grinder showing relationship of master-roll to the grinding wheel and the position of the work-table and fixture before grinding.

E-31—Air-Operated Tapping Unit

Black Industries of Cleveland, Ohio, is making a new air-operated tapping unit which uses the same principal of traversing the rotor as in the Black drilling units. The rotor actually shifts for the full length of stroke so that the motor shaft can be made solid, not splined, which provides for extreme rigidity and accuracy.



Black air-operated tapping unit

The unit is operated by air through a double-acting air cylinder controlled by a built-in four-way air valve. Adjustable needle valves control the flow of air so that the tap follows its own lead without chamfering the first threads and does not strip the threads on the return stroke.

Reversal is obtained through a secondary air cylinder, operating from the same air supply as the main cylinder, which uses a limit switch to reverse the motor when the tap has reached the proper depth at the same time that the main air cylinder starts the return stroke. Depth control is held within 0.001 in. so that there is no danger of tap breakage even when tapping blind holes.

These units are designed to work in any position and at any angle for use in production work either singly or in gangs on index or transfer machines.

E-32—Motorized Centers Attachment

Flat, curved or circular work; straight, taper and contour outlines—simple or in any combination—all within 0.0005 in., can be set up for grinding with a new attachment called Motorized

Moore Motorized Centers Attachment

NEW Production and Plant EQUIPMENT

For additional information please use coupon on page 58

Centers, developed by the Moore Special Tool Co., Bridgeport, Conn. The tool also provides for indexing in the same setting. In addition to use on surface grinders, it can be used on jig borers, jig grinders, drill presses, light milling machines and as an inspection tool.

Motorized Centers consists of a rocking bed which will swing 20 deg to either side of horizontal. When used with an angle plate, the maximum taper angle becomes 30 deg. Upon this bed is clamped the base plate, dovetailed to permit sliding the head- and tail-stocks to position. The head-stock is equipped with a live center and index plate with 24 holes, jig drilled to a tolerance of ±0.001 in. for spacing. The head-stock is mounted on pre-loaded precision ball bearings. Versatility of this device is said to result largely from the simple tail-stock center which permits use of special centers such as male-female and cutaways.

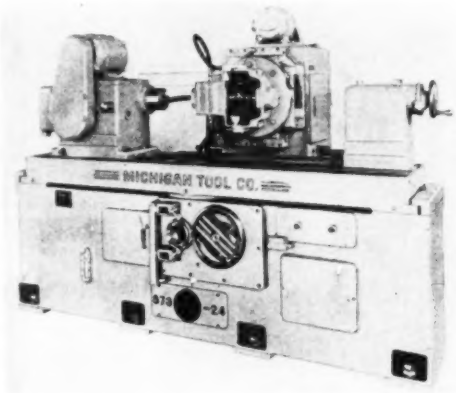
Overall length of Motorized Centers is 12 in., and width (including motor) is 10 in. Height overall is 8 in, distance between centers 6 in., and it swings 6 in. Equipped with a 1/25 hp motor, the complete unit weighs 34 lb.

Use of this attachment permits work ordinarily requiring a large expensive machine or a variety of special tools and attachments. All steps can be accomplished with the same set-up, since tapers can be reversed or changed by loosening two screws in the rocking bed, and the indexing plate can be engaged by pressing a plunger.

E-33—Rotary Gear Shaver

A high production crossed-axis rotary gear finisher, Model 873 for heavy duty gears, brought out by Michigan Tool Co., Detroit, Mich., handles spur or helical gears and involute splines from zero to 18 or 24 in. dia. and up to 15 in. face width. Available in two sizes, the machine is completely automatic in operation once the machine is set up for a given gear type.

In addition to automatic operation for production-line operation, this gear finisher will shave gears by any of three methods — "underpass," "transverse," or "traverpass"; and it will curve shave (crown) wide face gears, as well as narrower gears. A special interchangeable cutter head is available for finishing of internal gears.



Michigan model 873 rotary gear shaver

Ability to select any of three shaving methods permits the new 873 to finish all kinds of heavy duty gears in production — narrow, wide, or shoulder type, crowned or curve-shaved — plus either short or long involute spline.

In the Underpass method the cutter slide moves the cutter tangentially to the work. This method, used for gears up to 4 in. face width, is said to give maximum cutter life and fastest finishing, only one or two passes being required. For this method, shaving cutters are made slightly wider than the widest gear to be finished.

In Transverse shaving, used for wider face gears, the cutter slide reciprocates the cutter across the face of the work, while the head slide feeds the cutter into the work. This feed is composed of a rapid approach plus a slower intermittent infeed (a small amount for each transverse reciprocation). Feed continues until size is reached, when the head returns to starting position for unloading.

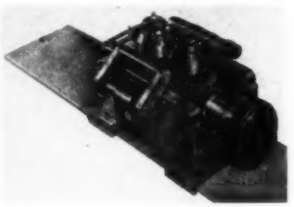
In Traverpass shaving (for gears up to 5 in. face) the cutter slide is set at some angle (less than 90 deg.) to work axis — the actual angle depending on the particular gear and cutter. Operation is as in "underpass" shaving except that the feed is part tangential and part across the face of the gear. This enables the use of cutters somewhat narrower than for "underpass" shaving the same gear. Cutting time is slightly longer than in "underpass" shaving.

Gears may be Curve-Shaved (crowned) while being finished with any of the three methods. Simplest method with "underpass" and most "traverpass" shaved gears is by the use of reverse-crowned cutters.

To permit "curve-shaving" with the "transverse" method and for some "traverpass" shaved gears, the work table is pivoted at its center. An available auxiliary power-driven adjustable sine-bar mechanism rocks the work table about the center pivot.

E-34—Continuous Width Gage

Pratt & Whitney, Division of Niles-Bement-Pond Co., West Hartford, Conn., are putting out a new continuous width gage which indicates the diameter or width of a continuous roll of round or flat (bare or insulated) wire, or thin strip material, as it is being being processed.



Pratt & Whitney "magnetic" continuous width gage, Model B

This model B "magnetic" continuous

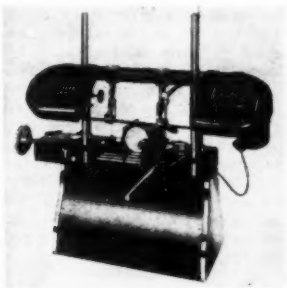
width gage, consisting of the gage head, slide base, meter and power unit, has two gaging rolls which are in continuous contact with the wire or material as it passes through the gage. The wire is guided through the gaging rolls by two leveling rolls under tension which flatten out the material and control the passline so that a true measurement is indicated.

Any variation in diameter or width from the predetermined setting is instantly and greatly magnified electrically, and shown on the indicating meter. The width gage is set directly to the required measurement by a micrometer dial and no masters are required.

The "magnetic" continuous width gage can be used with a control meter to signal the operator, or to automatically make corrective adjustments to maintain the predetermined measurement.

E-35—Metal Cutting Band Saw

Announcing a new 9 in. metal cutting saw, Model M, the new company of W. F. Wells and Sons, Three Rivers, Mich.,



Wells metal cutting band saw, Model M

have designed their saw for milling and planing operations—slotting, removing corners of die blocks, etc. The machine raises and lowers hydraulically to afford smooth operation. Capacity is 9 in. by 18 in., with maximum clearance under the saw blade of 20 in. Swivel vise operates 45 deg in either direction. Blade length is 11 ft 5⅜ in. by 0.032 in.; floor space occupied, 20½ in. by 66 in. All rotating parts operate on ball bearings. Columns placed at each end of the machine afford maximum rigidity.

The cutting head is one piece welded construction which includes beams for blade guides and column housing and to assure alignment and total blade enclosure. Blade guides have single screw adjustment for rotating the blade, in prolonging its life and correcting the drift.

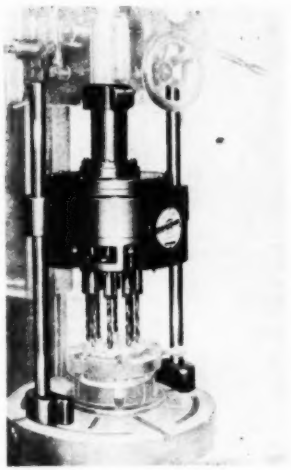
A quick action vise on a continuous screw clamps rigidly in all positions. Tip off block is constructed for clamping and bolting jigs, fixtures, etc. Stock stop automatically moves out and up at completion of the cut to eliminate binding of stock on the blade. A rotating blade brush cleans chips from between the teeth as well as from the sides.

NEW Production and Plant EQUIPMENT

For additional information regarding any of these items, please use coupon on page 58

E-36—Multi-Spindle Drill Head

An adjustable multiple spindle drill head of the U. S. Drill Head Co., Cincinnati, Ohio, is designed to reduce drastically multiple drilling costs by eliminating expensive changes in set-up from job to job. As much as 90 per cent of this drill head can be left intact, yet a complete engineering change-over accomplished by simply changing the drill



Adjustafix multiple spindle drill head of the U. S. Drill Head Co.

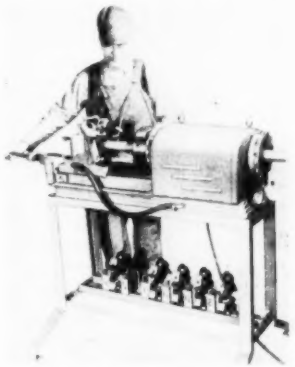
pattern plate and relocating the spindles on the new pattern plate to conform to the new design. Number of drill patterns possible is limited only by the number of pattern plates available.

The spindle and idler constructions are entirely separate assemblies, both self contained. For this reason, use of compound gears on the idler shaft gives exactly the tool speed required for a given job. No change of gearing is necessary in the main drive box when tool speed is changed.

The Adjustafix multiple spindle drill head can be installed on machines now in use, and can be used not only for drilling, but for tapping, reaming, spotfacing, boring, counterboring, and milling operations. Though designed principally for multiple operation, the head can be adapted to single spindle operation. All heads have fully automatic lubrication for either horizontal or vertical operation.

E-37—Pipe Handling Machine and Check

A triple purpose, portable machine for cutting, reaming and threading pipes to 2 in. diam and threading solid rounds to 1½ in. diam is a product of the Peerless Machine Co., Racine, Wis.



Peerless Threadfast machine with wrenchless chuck for pipe threading, reaming, cutting

With this portable unit, it is possible to rapidly chuck and unchuck work as the spindle rotates, accomplished with a new type Roto-Lok wrenchless chuck which in effect is a rapid acting rotary vise. Pipes, solid rounds, and bolts are quickly centered and rigidly held. The chuck is designed to instantly grip and release the work. It holds galvanized or glazed pipes, polished rounds and similar difficult-to-handle work. The Roto-Lok wrenchless chuck may be used for right or left hand rotation.

Pipe diam ⅛ in. to 2 in. and bolt diam ⅜ in. to 1½ in. can be placed through the rear centering unit and the Roto-Lok wrenchless chuck. A simple adjustment of the rear centering unit supports one end of the pipe. Turning the hand wheel of the Roto-Lok wrenchless chuck centers the other end, and locks the pipe in position for thread-

ing, cutting and reaming operations.

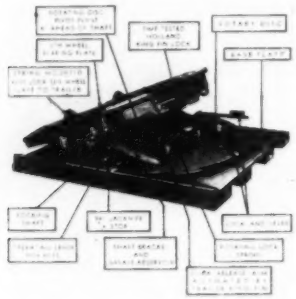
It is unnecessary to stop the machine to reposition the pipe. After a thread is cut, and the die head clamp released, the pipe is removed by hand. All that is necessary is to rotate the work faster than the machine spindle turns, which immediately releases the chuck holding jaws.

NEW ★ PRODUCTS

For additional information regarding any of these items, please use coupon on page 58

F-46—Extra-Stable Fifth Wheel

The Holland Hitch Co., Holland, Mich., is now in production on a new



Holland-Apgar fifth wheel for tractor-trailer highway haulers

type Holland-Apgar fifth wheel designed to cut highway accidents involving tractor-trailer freight haulers. The new fifth wheel is said to make heavy outfits nearly as maneuverable as a passenger car by permitting sharp swerves and turns with safety. It also is claimed to eliminate costly and dangerous tip-overs during sharp angle approaches to landing docks, and during operation over rough or uneven ground.

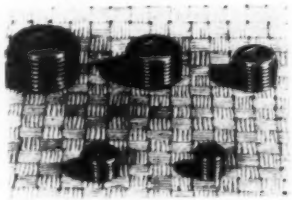
This Holland-Apgar hitch accomplishes this by a 4 in. offset in the pivot of the fifth wheel, which in turn is mounted in a swiveling base plate, keeping the fifth wheel always parallel with the trailer axle. As the tractor turns, the center of gravity of the trailer load is shifted to the inside of the turn. The sharper the turn, the greater the offset of the load, achieving the effect of the "banking" on a highway curve in making the trailer maneuverable, safe and stable.

A further improvement is a constant 4-point suspension of the trailer load, rather than the 3-point suspension found in present fifth wheels. This provides a better base for the load. An anti-jacknifing stop built into the Holland-Apgar fifth wheel permits a swivel of 4 deg beyond 90 deg and minimizes bump damage to tractor cab or trailer.

Both faces of the swivel base are an integral part of the fifth wheel—protected from weather and constantly lubricated by a grease reservoir on the upper part. Friction, wear and hard turning due to faulty lubrication and abrasive substances on the present type of fifth wheel are thereby eliminated.

Of moment to fleet owners is the fact that the lower plate can be converted into a standard fifth wheel by removal of one cotter pin. Or, the upper fifth wheel of the trailers can be converted to full use with the Holland-Apgar wheel by the cutting of two slots. These slots do not interfere when the trailer is used with conventional fifth wheels on tractors. Therefore, there is no problem in the gradual conversion of a fleet to the Holland-Apgar wheel, and tractors so equipped can be used with unconverted trailers of other fleets.

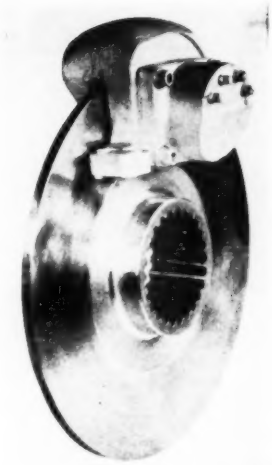
F-47—New Line of Pipe Plugs



Units in a new line of precision-made standard countersunk pipe plugs announced by the J. J. Tourek Mfg. Co., Chicago, Ill., are manufactured of specially selected steel on automatic screw machines by mass production methods. Standard stock sizes are ¼ in., ⅜ in., ½ in., ¾ in. and 1 in. dia., available with National Pipe or Dry-Seal threads. Tourek pipe plugs can also be furnished in alloy steel, aluminum or brass in sizes up to 2⅝ in. dia

F-48—Single Disk Industrial Brake

An industrial brake, adapted from an airplane-type single disk brake for application on mine shuttle cars, is also reported to have been successfully installed on high speed band saws and huge press brakes for shaping metal. Developed at Goodyear Tire and Rubber Co., Akron, Ohio, further uses are in



Goodyear airplane type single disk industrial brake

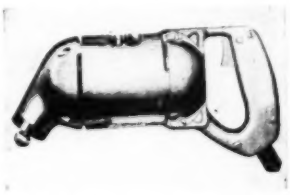
prospect for this single disk brake as auxiliary brake for giant earthmoving units, cross-country trucks and buses, and other heavy industrial machines.

A non self-energizing brake, it gives a soft-cushion braking action in contrast to quick-grabbing action of conventional types, the company explains. The brake has a straight line torque curve throughout braking range and gives equal torque in both directions. Said to be easy to reline or replace and self-adjusting over the entire life of the lining, its self-adjusting feature enables operators to enjoy a permanent pedal stroke at all times.

F-49—Heavy-Duty Power Driver

The Black & Decker Mfg. Co., Towson, Md., introduces a new more powerful heavy-duty 55 deg Vibro-Centric driver to their line of valve reconditioning equipment, available in two new kits.

The driver is suited for reconditioning truck, tractor and diesel valves where a powerful, high speed driver is essential. The angle drive of the unit improves working clearance where body, cowl, cab or other obstructions inter-



Black & Decker heavy-duty Vibro-Centric Centric driver

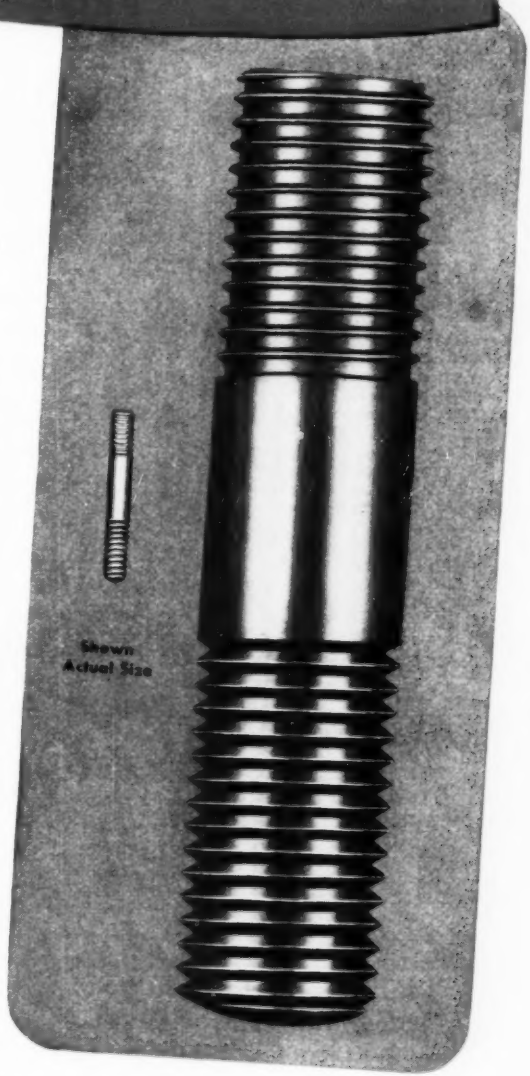
They're both LOK-THRED

NOW . . . get Lok-Thred's greater strength . . more positive locking action . . in *any* size stud, bolt or screw

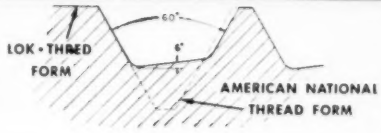
Are you making full use of LOK-THRED'S proved advantages—and its availability in any size or type of threaded fastener?

The revolutionary LOK-THRED design locks securely and becomes tighter in service . . . has much higher fatigue limits and is stronger in both tension and torsion than ordinary American National Threads...does not require selective fits.

These and other LOK-THRED features may offer important application advantages in your products. For full information, write for LOK-THRED booklet, today.



SEE THE DIFFERENCE!



Note Lok-Thred's larger cross section . . . and flat root surface instead of a relatively sharp "V" . . . as compared to the American National Thread form. Here's the secret of Lok-Thred's greater strength.

1949 NATIONAL AIR RACES SEPT 3-4-5 CLEVELAND

National Screw and Tube Products

THE NATIONAL SCREW & MFG. CO.
Cleveland 4, Ohio

Pacific Coast: National Screw & Mfg. Co. of Cal.
3423 So. Garfield Ave., Los Angeles 22, Cal.

fere. Driving spindle incorporates a positive vibrating action, which lifts the grinding stone from the seat once each revolution and prevents stone loading, speeds up grinding and reduces stone wear.

Spindle speed has been stepped up to 12,000 rpm. A smaller gear case gives greater clearance under the hood. Weight has been reduced to only $6\frac{1}{2}$ lbs; overall length to $11\frac{1}{2}$ in.

The heavy-duty 55 deg driver is grease-sealed ball-bearing equipped throughout. All spindles and gears are of heat-treated alloy steel. Housings are made of light-weight aluminum castings. Standard voltages are 110 or 220, although the tool is available with 125 or 240 volts. Motor is universal.

NEW ★ PRODUCTS

For additional information regarding any of these items, please use coupon on page 58

F-50—Automatic Transmission

A different fully automatic transmission of high mechanical efficiency is being placed on the market by Powermatic, Inc., Akron, Ohio. The unit is said to sense the need for a change in gear ratio and to shift automatically without any attention. It maintains a constant load, even during shift changes, and shifts without the slightest shock. It is claimed simple in design and construction, with no hydraulic system, fluid coupling, band brakes, multiple disc clutches, multiple valves or other delicate parts to fail or get out of adjustment.

The Powermatic unit, adaptable to any application requiring automatic speed change, can be built with up to eight gear ratios and used on anything from railroad locomotives and deep-drawing industrial presses to oil-well drilling equipment and automobiles, says the company. At the present time it is being produced only in a two-speed transmission with automatic clutch adapted for Whizzer and other bike motors, motorcycles, industrial trucks, etc., requiring high starting torque.

In the drawing, the shaded areas show the parts concerned in the transfer of power. When the motor is idling complete slippage takes place in the automatic centrifugal clutch driven by the inner shaft and no power is delivered. This clutch has only nine main parts and takes up its own wear.

As the motor speed increases the clutch gradually engages and the power flows into the first half of the hollow shaft, through a set of spool gears and out the second half of the hollow shaft, to the delivery pulley. These spool gears, turning freely, give a 1.7045 to 1 ratio for "low" gear.

When motor speed reaches a certain point a governor cam, operated by centrifugal weights on the hollow shaft, gradually applies braking pressure on the small cone brakes which are attached to the spool gears. As the spool gears turn more and more slowly the gear ratio sinks gradually from 1.7045 to 1 until the spool gears come to a stop and both halves of the hollow shaft are in effect locked together. The unit is then in direct drive, or "high" gear.

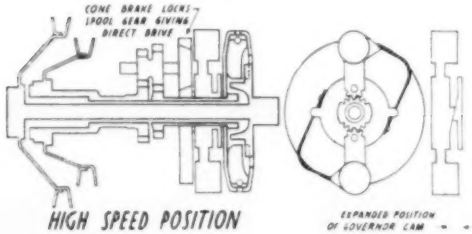
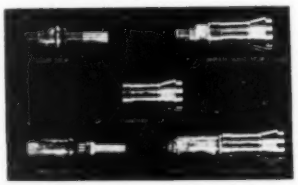


Diagram of Powermatic automatic transmission Model "OO"

F-51—Stop Collets And Stops



New standardized stop collets and stops for Brown & Sharpe machines, announced by Hardinge Brothers, Inc., Elmira, N. Y. With these stop collets and stops the operator or setup man can easily apply either a solid stop or spring ejector stop for a standard stop collet. Hardinge standard stop collets are threaded for direct application of either the spring ejector or solid stop, as illustrated

F-52—Miniature Contour Projector

A miniature contour projector manufactured by Stocker and Yale, Marblehead, Mass., is an optical instrument designed to provide all industry with the advantages of optical in a shape best suited for general application.

Stocker and Yale miniature contour projector

Although similar to other projection systems optically, the introduction of a totally enclosed screen allows the unit to be used anywhere and at any time without interference from surrounding lighting conditions.

Standard magnifications are 120, 90, 60, 45 and 30. Values above, below and in between the standards are available but special. The standard screen size is 6 in. square and the field of coverage at any magnification may be calculated by dividing magnification value into 6 in.

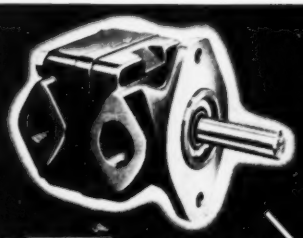
Application of the projector is usually made by means of a staging fixture which accepts the part to be checked in the most efficient manner for a rapid yet extremely accurate gaging operation. Often several dimensions on a single part are checked simultaneously. Such operations as fine assembly and adjustments may be watched as the operation is being performed assuring a final correct condition independent of the dimensions which make it up.

The standard projector is equipped with one blank opaque screen, light source and lamp house, complete optical system for one standard magnification, and operates on 115 volts 60 cycles A.C.

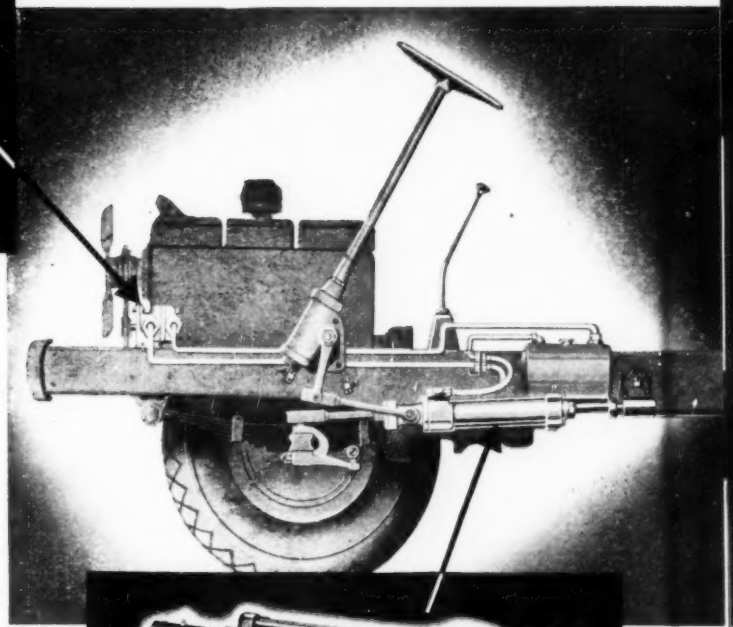
F-53—Die Head for Valve Seat Rings

An internal-trip type die head for threading valve seat rings up to dia. of $1\frac{1}{4}$ in. has been developed by the Landis Machine Co., Waynesboro, Pa. The die head is normally furnished without the internal trip when the valve seat rings are chucked and faced in relation to the chuck. This arrangement permits setting the stops on the

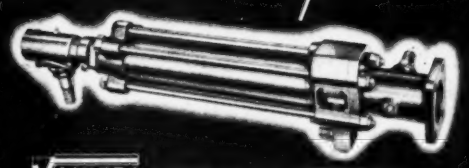
VICKERS Hydraulic Steering System COSTS YOU 20% Less THAN PREWAR



VICKERS SERIES V-200
BALANCED VANE PUMP
See Bulletin 49-52



At the current low prices, your new models should offer the added sales advantages made possible by VICKERS Steering System



VICKERS HYDRAULIC STEERING BOOSTER with integral overload relief valve . . . *See Bulletin 47-30a*

Improved design, better tooling and production methods of the past 10 years have resulted in a more than 20% price reduction in the Vickers Hydraulic Power Steering System. This saving greatly broadens the application possibilities of the Vickers Steering System.

Important among the many advantages of the Vickers Steering System are safety, effortless steering, adaptability and operator satisfaction. The resulting substantial customer acceptance and preference for Vickers Hydraulic Power Steering System is evident from its specification as original equipment by an increasing number of mobile equipment builders and operators alike.

3987

VICKERS Incorporated

DIVISION OF THE SPERRY CORPORATION

1428 **OAKMAN BLVD.** • **DETROIT 32, MICHIGAN**

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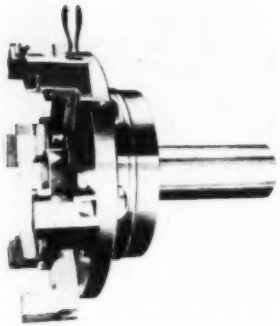


Landis die head for valve seat rings. Landmatic 40AXX

turret so as to allow the normal pull off action to trip the die head.

For thread sizes larger than 9 5 16 in. dia an enlarged closing ring is mounted on the head to support the oversize chaser holders. Varying thread lengths of different valve seat rings can be taken care of by the height of the oversize holders.

The chasers used are six per set having a 30 deg short roughing and finishing throat. The coarsest pitch recommended is eight threads per inch. Chaser holders have a diametrical adjustment of approximately $\frac{5}{8}$ in. on the larger size. This permits the same chaser holders and chasers to be used for different diameters.

F-54—Micro-Switch Centrifugal Governor

A micro-switch centrifugal governor designed to turn off motor, engine or other electrically energized equipment when a pre-determined speed limit has been exceeded, is a development of the Pierce Governor Co., Anderson, Ind.

The micro-switch governor is recommended where investigative or corrective measures must be taken before "runaway" equipment is put back into operation. An example would be a liquid circulating system having a motor driven pump operating under constant load conditions. Increased motor speed caused by leakage in the system would be checked at a pre-determined point since the governor with its micro-switch attachment would operate to break the electrical circuit to the pump motor.

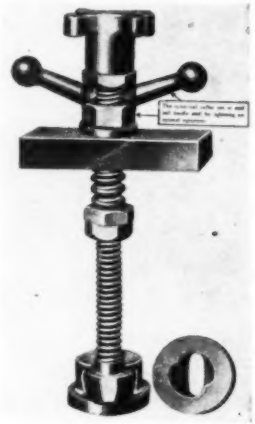
As the micro-switch must be reset manually before the motor can be started again, such equipment is always fully protected until the leak is repaired, and system loss or other damage is averted until repairs can be made.

The micro-switch feature is available on Pierce direct drive and Pierce cable driven centrifugal governors. The cable-driven governor provides a flexible drive shaft with pulley, gear and tachometer adaptors which permit power take-off from remote sources.

NEW ★ PRODUCTS

For additional information regarding any of these items, please use coupon on page 58

F-55—Fixture Clamp



Fixture clamp offered by Morton Machine Works

Morton Machine Works, Detroit, Mich., offers a fixture clamp for clamping a casting through the bored hole onto a pilot plate.

Clamping is done by means of an alloy tee bolt engaging a hardened insert which is furnished with the clamp. This insert is ground for a press fit in the bottom of the pilot plate.

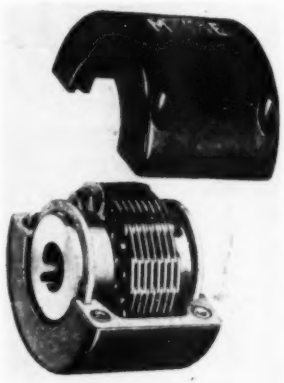
The tee bolt can be cut off to suit any height of job. Also the hand knob used as a handle can be adjusted to suit.

The spherical collar nut or steel ball handle used for tightening are optional equipment. Lock nuts and spring can also be adjusted for height and prevent clamp strap from dropping to the bottom of the tee bolt.

F-56—High-speed Drills and Reamers

High-speed twist drills and reamers have been added to the line of Charles H. Besly and Co., Chicago, Ill.. The new Besly drills and reamers, like Besly taps, will be sold through a selected group of industrial distributors.

F-57—Chain Coupling Plastic Covers

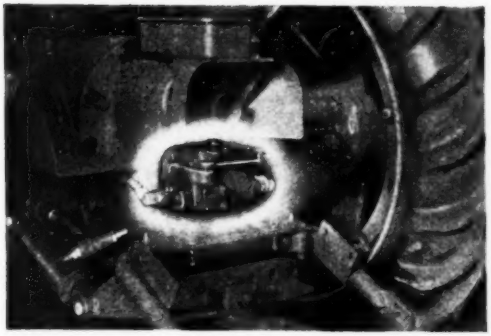


Plastic covers for chain couplings, a recent development of Morse Chain Co., Division of Borg-Warner Corp., Chicago, Ill., are molded of rag-filled phenolic plastic for maximum strength with minimum weight. Plastic material used is said to be highly resistant to practically all acids and alkalies, and immune to rust. Two-piece construction of the covers has slot head screws, requiring only an ordinary screwdriver to put together, after the coupling has been completely installed. Streamlined for safety, covers provide sealed-in lubrication.

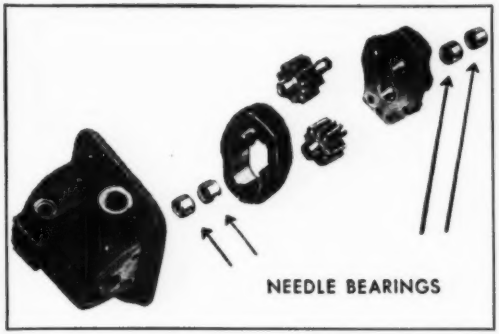
F-58—Portable Cable Cutter

Portable, hand operated cable cutter, introduced by the Beverly Shear Mfg. Co., Chicago, Ill., employs a downward circular cutting principle which imparts a slicing rather than a pinching action for sharp clean cuts of every strand of the steel cable, at one stroke. The cutter is adapted to cutting hollow core material, steel reinforced rubber hose, heavy electrical cable, conduit, etc. A snap-action hold down permits size adjustments to be made with a flick of the finger.

Torrington Needle Bearings Pack More Power Into Hydraulic Gear Pumps

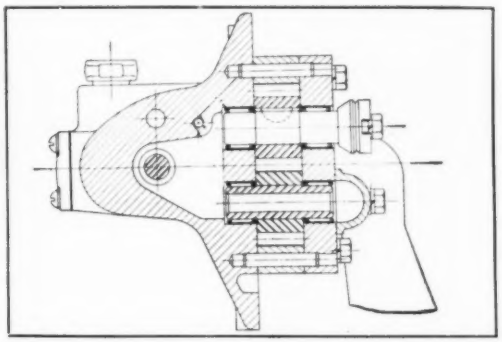


The swift-acting, powerful hydraulic control unit on J. I. Case tractors depends upon a high-efficiency, high-capacity gear pump. To maintain close internal clearances and good alignment, Case has developed an excellent design incorporating Torrington Needle Bearings.



Exploded view of the pump is shown above. Four "Precision Series" Torrington Needle Bearings provide the ultimate in internal pump clearances and match the high accuracy of the other pump parts. By reducing wear, they help assure peak mechanical efficiency and long service life.

The small diameter and retaining feature of Needle Bearings simplify design and assembly. Installed by an arbor press, Needle Bearings take a firm press fit in straight-through housings, need no retaining devices. They use the hardened and ground shafts as inner races.



Cross-section of the pump shows the compact design secured. Needle Bearings permit the use of larger and stiffer shafts with short housing width, minimizing deflection. Adequate surface is provided for sealing at the ends of each gear without lowering pump efficiency.

In designing gear pumps for automotive, aircraft, farm, construction and industrial equipment, use Needle Bearings to secure the best features of pump design. Our engineers will gladly assist you in analysis of designs and bearing recommendations. Write us today. THE TORRINGTON COMPANY, Torrington, Conn., or South Bend 21, Ind. District offices and distributors in principal cities of United States and Canada.

TORRINGTON *NEEDLE* **BEARINGS**

Needle • Spherical Roller • Tapered Roller

Straight Roller • Ball • Needle Rollers

PERSONALS

Recent Personnel Changes and Appointments at the Plants of the Automotive and Aviation Manufacturers and Their Suppliers.

The Studebaker Corporation—**John Soelch** has been appointed Director of Purchases, succeeding **C. N. Rhoutsong**, who has resigned due to ill health.

Oldsmobile Div., General Motors Corp.—**J. J. Dobbs** has been named administrative assistant to the general sales manager. **Harry R. Ekblade** succeeds Mr. Dobbs as General Service Manager for the division.

General Motors Corp.—The appointment of **Semon E. Knudsen** as Director of the Process Development Section of the Facilities and Processes Staff, has been announced.

Chrysler Corp.—The appointment of **Hayward F. York** as Assistant Plant Engineer of the Plymouth Division has been announced, also the announcement of the appointment of **E. C. Dock**, as Business Management Manager of the Dodge Division.

Ford Motor Company—**Walter H. Simpson** has been appointed Acting General Manager, Parts and Equipment Manufacturing Div., at Ypsilanti, Michigan.

Curtiss Wright Corp.—Announcement has been made of the election of **Roy T. Hurley** as President and Director of the Curtiss Wright Corp.

Douglas Aircraft Co., Inc.—**John M. Rogers** has resigned his post as Vice-President and Director of military sales. **L. E. Tollefson** has been made Secretary.

Columbia Steel Co.—**R. E. Williams** has been appointed assistant to the Vice-President in charge of sales, **O. L. Pringle**.

Stanley Aviation Corp.—**Richard H. Frost** has joined the company as senior project engineer.

Fairchild Engine and Airplane Corp.—The following appointments have been announced: **George T. Ladd** as Production Engineer and **Howard W. Crusey** as Sales Engineer of the Al-Fin Division.

The Electric Auto-Lite Co.—The appointment of **Lyman A. Wine** to the executive post of Assistant to the President has been announced.

Borg-Warner Corp.—The election of **J. W. Primeau** of Merriton (Ontario) as president of the newly established B-W-H Service Parts, Ltd., has been announced. Other officers are **J. W. DeLind, Jr.**, Vice-Pres., and **E. P. McGavin**, Secretary-Treasurer.

Stewart-Warner Corp.—**George Zahn**, formerly sales manager of the Instrument Division, has been appointed assistant for marketing to **F. A. Hiter**, senior Vice-President.

Westinghouse Electric Corp.—The appointment of **W. J. Howell**, as assistant to the manager of the apparatus sales, has been announced.

The Federal Machine & Welder Co.—**Malcolm S. Clark** has resigned as president and member of the Board of Directors. He is succeeded by **A. S. Blagden**, who was, a short time ago, named executive vice-president.

Air Reduction Sales Co.—**L. B. Dobbins** has been appointed supervisor of plant engineering.

Libbey-Owens-Ford Glass Co.—Promotion of three factory executives has been announced as follows: **Melvin Burwell** has been named management assistant to **C. W. Davis**, vice-president and general factories manager; **Arthur J. DeMars** has been made chief engineer, succeeding **Joseph A. Norris**, resigned; and **Herbert Young** has been made plant industrial engineer at Rossford, succeeding Mr. Burwell.

B. F. Goodrich Co.—**E. R. Traxler** has been named manager of the new flat belting field engineering and development department.

The Firestone Tire & Rubber Co.—**W. E. Lyon** has been made manager of the Tire Development section.

Koppers Co., Inc.—**S. H. Fedan** has been named assistant to the sales manager of the company's metal products division.

Hunter Spring Co.—The appointment of **Orrin G. Meyers** as Sales Manager has been announced. He succeeds **William J. Trendler**, resigned.

Taylor Instrument Companies—**William H. Corwin** has been appointed Public Relations Director.

The S. G. Taylor Chain Co.—**E. W. Chapman** has been promoted to Asst. Sales Manager and **S. N. Morrison** has been made Manager of Industrial Sales.

American Standards Assoc.—**H. L. Miner**, Manager, Safety and Fire Prevention Div., E. I. duPont de Nemours & Co., Inc., has been named chairman of the Safety Code Correlating Committee.

Necrology

Ralph L. Polk Sr., 67, retired president and chairman of the board, R. L. Polk & Co., died in Bloomfield Hills, Mich. on Aug. 5.

William F. Slomer, 71, former general sales manager, the Fellows Gear Shaper Co., died in Hendersonville, N. C. on Aug. 4.

Thomas P. Archer, 64, vice president and a director, General Motors Corp., died on Aug. 10 in Detroit, Mich.

James H. Cassell, 62, founder of three Oregon automobile dealer associations, died recently in Portland, Ore.

William H. Strohm, 84, a pioneer automobile designer, who helped produce the first sleeve-valve engine for the Willys-Overland Co. before World War I, died Aug. 12 in Buffalo, N. Y.

Roy E. Hammond, 53, controller, General Motors Corp., died on Aug. 17 in Detroit.

Ezra W. Clark, 69, retired vice president of Clark Equipment Co., died in Battle Creek, Mich. on Aug. 11.

Leo Edwin Levey, 60, general sales manager, Dunlop Tire and Rubber Goods Co., Ltd., died Aug. 10 in Orillia, Ontario, Canada.

James B. Smith, 59, former production manager of the Ford Motor plant in Windsor, Canada, and more recently production manager at the John Inglis Co. plant in Toronto, died Aug. 16.

Packard Prices Less Today Than 25 Years Ago

Even though automobile prices today are much higher than they were before the war, buyers are relatively much better off than they were 25 years ago, according to George T. Christopher, president of Packard. At a meeting honoring 187 employees who have been with the company for 25 years, he pointed out that in the past quarter century, the price of new Packards has dropped 53 per cent, whereas those of most basic materials used in car building have risen 53 to 311 per cent. In 1924, he said, the price of a Packard was $4650, compared to $2249 today, with the latter figure including about $826 in taxes.

PUBLICATIONS AVAILABLE

Publications listed in this department are obtainable by subscribers through the Editorial Department of AUTOMOTIVE INDUSTRIES. In making requests please be sure to give the NUMBER of the item concerning the publication desired, your name and address, company connection and title.

D-52—Heat Treating Stainless Steels

Armco Steel Corp.—A new 36-page booklet, Heat Treating and Pickling of Armco Stainless Steels, presents comprehensive and up-to-date information on heat treating and pickling methods for stainless steels. Recommended procedures, based on practical experience and extensive work in the company's research laboratories are given in detail. Charts and graphs are extensively used to summarize heat treatments and show the effect of variations in heat treating procedure on the mechanical properties of stainless steels. General practices and equipment for heat treating stainless; recommended heat treatments for various metals are discussed. Important new material on heat treating the stabilized grades, how heat treatment affects corrosion resistance are included.

D-53—Grinding Wheels

The Cincinnati Milling Machine Co.—In the current issue of Report from Cincinnati Milling, company publication, an important research development, a new grinding wheel, is discussed and illustrated.

D-54—Straightening Presses

The Hydraulic Press Mfg. Co.—A new bulletin, No. 4902, describes and illustrates the new H-P-M two-way all-hydraulic straightening presses. The presses are designed for straightening structural shapes, weldments, forgings, castings, etc.

D-55—Kodak Gear Checkers

Eastman Kodak Company—A new 12-page booklet describing the Kodak Conju-Gage line of gear checking instruments is available. It contains a brief discussion of the Kodak Conju-Gage Worm Section. Complete specifications are given for the gages for making a composite check of spur and helical gears.

D-56—Hobbing Machines

Barber-Colman Company — A new machine tool catalog contains complete specifications of all the company's hobbing and hob sharpening machines. It also includes an elementary, easy-to-understand description of the hobbing process. The various models of hobbing machines are illustrated, specifications given, features listed and application data included. Information is given on extra tooling and equipment for special hobbing applications. Several models of sharpening machines are illustrated, described and specifications given.

D-57—Delco 40th Anniversary Booklet

Delco Products Div., General Motors Corp.—The Spark of Genius is the title of a 48-page booklet written to commemorate the 40th anniversary of the incorporation of Dayton Engineering Laboratories Company. The booklet tells the story of Delco, illustrates and describes Delco's current products, takes the reader through the three plants of the division, explains the company's employee relations, etc.

D-58—Flexible Chain Couplings

Borg-Warner Corp., Morse Chain Div.—Subjects covered in a new 16-page catalog on flexible chain couplings are as follows: roller chain stock couplings; silent chain stock couplings; heavy-duty, made-to-order silent chain couplings and steel and plastic covers for the two stock couplings. Complete information is given on dimension data, hp ratings, stock and maximum bores with many illustrations and useful descriptive matter.

(Turn to page 74, please)

TIME SAVER COUPON for your convenience in obtaining, WITHOUT OBLIGATION, more information on any one or more of the publications described above OR New Production and Plant Equipment OR New Products items described on other pages.

Readers Service Department,
Automotive Industries,
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Your Company Connection or Business .....

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(Street & No.) (City) (Zone) (State)

General News

(*Continued from page 23*)

Cutting Fluid Research Group to Resume Activity

Announcement has been made that the Independent Research Committee On Cutting Fluids is to be expanded in membership in the near future, and will resume active work in the field of industrial utilization of cutting fluids. In its plans for the future, IRC intends to survey and publish up-to-date data on current cutting fluids practice. At the same time, the IRC program will be so designed as not to duplicate the area of activity of engineering groups such as ASTM and ASME, which have established research committees on cutting fluids during the past few years.

Ford Building Vehicles for Israeli Government

The Ford Motor Co. is starting production on an order for $4 million worth of trucks and buses for Israel. About 1800 vehicles are involved in the purchase. The company is deviating from its usual policy on sales to foreign governments in that it is requiring immediate payment of only 40 per cent of the total in dollars available to Israel from the Export-Import Bank, with credit extended on the 60 per cent balance to be paid in three equal annual installments.

USAF Tests Pilot Ejection from High Speed Jets

Successful ejection of airmen from an aircraft traveling 550 mph was announced by the Air Force Air Materiel Command. The tests, latest in a series of pilot-ejection seat tests from a jet airplane, were performed near Hamilton Air Force Base (Marin County), Calif. The "guinea pigs" were Capt. Vincent Mazza and Staff Sgt. Victor A. James, using a two-seat Lockheed TF-80 Shooting Star.

Ford Makes Four Appointments at Highland Park Plant

Ford has announced four major appointments in its Highland Park operations. They include Edward F. Wait as the assistant plant manager; C. F. Hancock, resident controller; Clifford E. Bernard, general superintendent of trim, paint and artificial leather manufacturing; and Clarence W. Brown, manager of work standards.

Chrysler Emphasizing "Crash Pad" Feature

The Chrysler Div. of Chrysler Corp. is currently emphasizing its "safety cushion" feature in its Silver Anniversary models. The division cites figures from the Detroit Police Department to show that the right front seat is the most dangerous location in a passenger car. The safety cushion is a padded area on the dash directly ahead of the right front seat.

Lockheed F-94 New Jet Fighter for USAF

An advanced version of the Lockheed F-80 Shooting Star jet fighter, the new Lockheed F-94, has been announced by the U. S. Air Force. A 24-hr night fighter, the F-94 is a two-seat airplane, basically resembling the new USAF jet trainer, the TF-80C. With the same wing and fuselage structure as the standard Shooting Star fighter and the same Allison-built jet turbine engine, it is said that production of the new all-weather plane will require a minimum amount of new tooling.

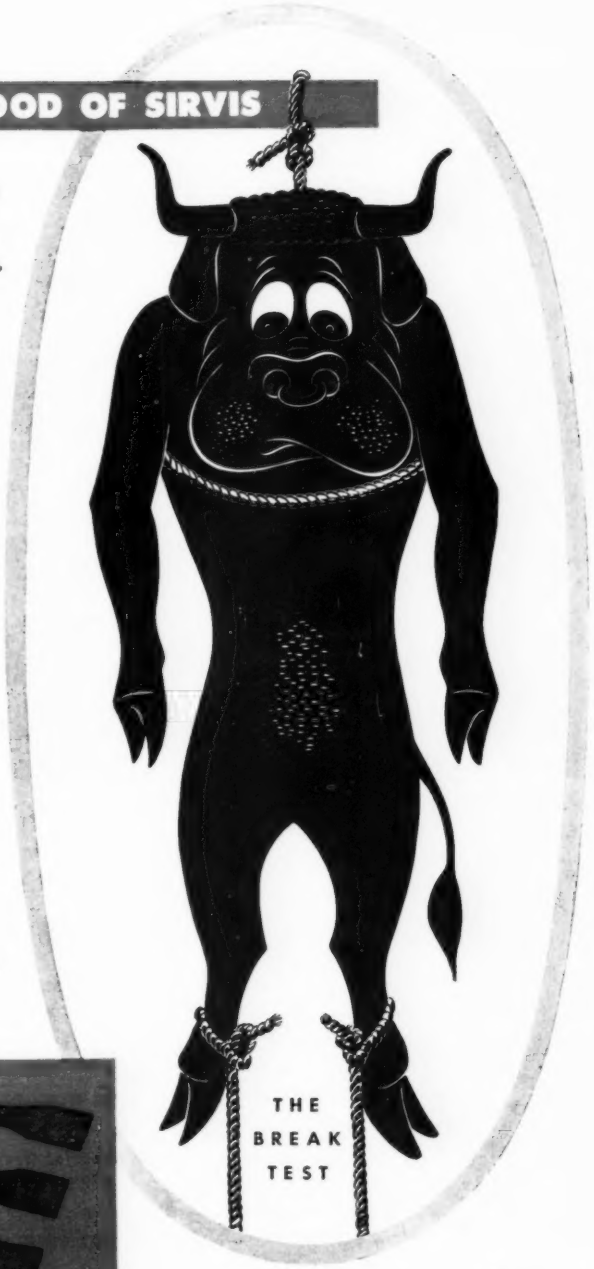
(*Turn to page 62, please*)

IT'S ALL FOR THE GOOD OF SIRVIS

Stretching steers is out of our line. But, in testing Sirvis' tensile strength, steer*hide* is stretched until it breaks. Because Sirvis leather varies with tannage and treatments, each hide is given the break test to determine its suitability for varying applications. For example: a sample of steerhide being considered for transmission oil seals will be soaked in an "E. P." lubricant. The break test will then indicate the effects of this type of oil upon tensile strength. If the percentage of breakdown is well within the limits established for Sirvis oil seal leathers, the hide is certified for use. Similar immersion and break tests are conducted to determine the action of hot oil, water, salt solutions, and the many other liquids with which Sirvis leather parts must come in contact. In each case, the break test indicates the limits within which a given piece of hide can be used.

This is just one of the many laboratory-controlled tests to which Sirvis leathers are subjected . . . so that you may be assured of top quality in *packings, boots, gaskets, diaphragms and other mechanical leather products.* Because of extreme care in designing, excellence of materials, and constant checks in production, Sirvis mechanical leathers are outstanding in dependability.

• *For detailed information about Sirvis products, write for the free Chicago Rawhide catalog*



OTHER C/R PRODUCTS
PERFECT OIL SEALS
SIRVENE SYNTHETIC RUBBER

MECHANICAL LEATHER PRODUCTS **sirvis**

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General News

(*Continued from page* 60)

Replacement Engine Sales Far Behind Last Year

Sales of replacement engines and short blocks have slumped badly so far this year. One company cut off production entirely for a month in order to allow field inventories to diminish, and in that period did not get a single order from its dealers. Several months ago GM estimated that engine replacement sales would drop off 50 per cent this year, and the current trend indicates that the forecast was well founded.

July Personal Plane Exports Top $100,000

Exports of personal aircraft of four-place and under for the month of July, as reported to the Aircraft Industries Association by 10 companies, totaled 31 valued at $102,108, it was announced recently by the Association's Export Service. These totals compare with 47 planes valued at $187,075 reported by 10 companies for the previous month. The companies reporting the July data include Aeronca Aircraft Corp., Beech Aircraft Corp., Bellanca Aircraft Corp., Cessna Aircraft Co., Engineering and Research, Luscombe Airplane Corp., Piper Aircraft Corp., Ryan Aeronautical Co., Taylorcraft, Inc., and Texas Engineering & Manufacturing Co., Inc.

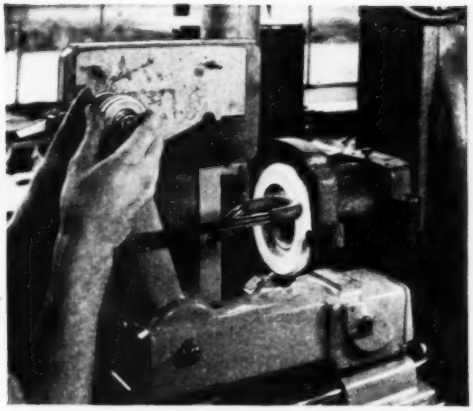
IHC Changes Administration of California Plant

The International Harvester Co. has decided to make its Emeryville Works, Emeryville, Calif., a self-contained operation. The geographical location of the plant and the nature of the problems involved in the manufacture and distribution of the products manufactured there were cited as reasons for localizing the activities of this motor truck manufacturing operation. As a result of this decision, J. W. Zimmerman, Jr., formerly special sales representative at Emeryville, has been named as manager of the Emeryville operation. Mr. Zimmerman will be responsible for all functions applicable to the Emeryville operation, including the pricing of products, communications with district sales offices, product engineering and manufacturing, and materials control. Mr. Zimmerman will report direct to the general manager of the motor truck division.

Planes With Metal Skins Immune to Lightning

Planes surrounded by all-metal "skins" are practically immune against lightning strokes, according to Julius H. Hagenguth, General Electric Co. lightning expert. In a paper prepared for presentation before the summer convention of the American Institute of Electrical Engineers, Mr. Hagenguth described results of experiments on lightning stroke damage to aircraft conducted throughout several years in collaboration with the National Advisory Committee for Aeronautics. The GE scientist is engineer in charge of the company's High Voltage Engineering Laboratory at Pittsfield, Mass., said to be the largest artificial lightning center, where the tests were conducted. While discounting lightning bolts as "serious potential hazards to properly protected planes," Mr. Hagenguth said that non-metallic planes, unless well shielded with a network of wires or other protective coating, are subject to damage from even minor lightning strokes of the order of 20,000 amperes, which may make the plane inoperable

FORM-GRINDING TO NEW STANDARDS OF ACCURACY



BY PRECISION-DRESSING WITH THE NEW

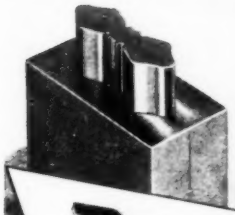
Diaform WHEEL FORMING ATTACHMENT

PRATT & WHITNEY

has it . . . the new precision DIAFORM: a portable attachment that can be used on any horizontal spindle surface grinder to form-dress grinding wheels *to tenths of a thousandth accuracy in a matter of minutes.*

Operating on the pantograph principle, DIAFORM accurately traces any form from an inexpensive template at a reduction ratio of 10:1. The dressing diamond is traversed over any grinding wheel up to 1" wide x 10" diameter by very light tracer pressure to form-dress the desired contour.

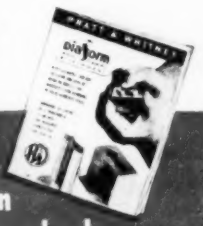
DIAFORM is built to exacting Pratt & Whitney standards of precision — to produce better dies . . . better punches . . . better flat forming tools *in hours instead of days.*



Pratt & Whitney

Division Niles-Bement-Pond Company
WEST HARTFORD 1, CONNECTICUT

This new Bulletin tells the whole DIAFORM story, illustrating the time-saving procedure to produce an accurate split die and punch, from drawing to finish-grinding. Drop us a card for your copy.



Diaform for low cost, precision form-dressing of grinding wheels

Reo Gold Comet Production

(*Continued from page 37*)

holders and the safety retreat type spindles. In addition, it has a valve-controlled lubricant spray, coating all spindles automatically before tapping is begun.

Last of the big machines in this line is the special Cross drilling machine having a two-station tunnel type fixture. This unit is arranged for the following important operations:

Finish-ream 12 valve guide holes. Finish-counterbore six exhaust valve seats. Semi-finish six intake valve seats. Ream valve guide holes. Finish counterbore exhaust insert counterbores. Semi-finish intake valve seats to gage.

The second and final part of this article will appear in an early issue of AUTOMOTIVE INDUSTRIES.

CALENDAR

Conventions and Meetings

Canadian Nat'l Aircraft Exhibition, Toronto ..... Aug. 26-Sept. 10
Nat'l Air Races, Cleveland ..... Sept. 3-4-5
British Aircraft Constructor's Flying Exhibition, Farnsborough Airfield, Hampshire ..... Sept. 7-11
Instrument Soc. of America Convention, St. Louis ..... Sept. 12-16
Amer. Chemical Soc. Atlantic City, N. J. ..... Sept. 18 to 23
Inst. of Traffic Engineers, Washington, D. C. ..... Sept. 25-28
British Passenger Car Show, London, Sept. 28-Oct. 8
Nat'l Defense Transportation Assoc., Atlanta ..... Oct. 3-5
Nat'l Lubricating Grease Inst., New Orleans ..... Oct. 3-5
Society of Industrial Packaging and Materials Handling Engineers Annual Exposition, Detroit ..... Oct. 4-7
Paris Auto Show, Paris ..... Oct. 6-16
Amer. Soc. for Testing Materials, Pacific Nat'l Mfg., San Francisco Oct. 10-14
Amer. Society for Metals Nat'l Metal Congress & Exhibition, Cleveland, Ohio ..... Oct. 17-21
Amer. Welding Soc. Annual Mtg., Cleveland ..... Oct. 17-21
Amer. Inst. of Mining & Metallurgical Engineers Metals Br., Cleveland Oct. 17-21
10th Annual Mtg. & Dinner Automobile Old Timers, New York City Oct. 18
Nat'l. Safety Council Safety Congress & Exhibit, Chicago ..... Oct. 24-28
Nat'l. Metal Trades Assoc., Annual Convention, Chicago ..... Oct. 26-28
Amer. Society Body Engineers Annual Tech. Convention, Detroit Nov. 2-4
Chicago Auto Show, Chicago ..... Nov. 4-12
Society for Experimental Stress Analysis Annual Mtg., New York Nov. 30-Dec. 2
Plant Maintenance Show, Cleveland Jan. 16-19
Pacific Automotive Show, San Francisco ..... Feb. 16-19
3rd Highway Transportation Congress, Washington ..... Apr. 26-27

Air Conditioning

(*Continued from page 45*)

of the job could be built for $500. With similar economy in the installation of heat-absorbing glass and special insulation, it should be possible to get the cost of the complete installation down to around $700 to $750 to the owner.

Granting that even the lower figures make air conditioning out of reach of the mass buying public, there is nevertheless a market in the highest price cars group, for ambulances, for armored cars, for delivery vehicles, and doubtless other applications. It stands to reason that greater promotion of air conditioning for motor vehicles will eventually encourage research and development leading to simpler equipment with consequently lower costs.

More Heavy-Duty Trucks

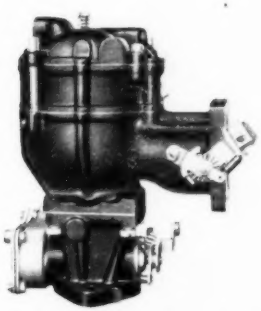
Run More Miles with ZENITH

than with Any Other Carburetor

Because . . .

Zenith

is the Engineers' Choice!



Leadership in any field is never easily achieved. Outstanding preference in the exacting field of heavy-duty carburetion, for example, has been earned by Zenith through 40 years of constant progress. Increased economy, improved performance and inherent dependability have all contributed to making Zenith the engineers' choice—both in the factory and in the fleet. See your Zenith Distributor for splendid service or for detailed information on Zenith* carburetors for your vehicles.

*REG. U.S. PAT. OFF.

ZENITH CARBURETOR DIVISION OF Bendix AVIATION CORPORATION

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MANUFACTURERS OF FINE CARBURETORS AND FUEL FILTERS

The new Snyder plant is unique in that it was designed and built specifically for the production of special-purpose machinery and is one of the most perfectly equipped and efficient plants in the world. In nearly a quarter-century of operation the Snyder organization has created an immense variety of special-purpose machines for many industries—aircraft, automotive, coal mining, farm equipment, electrical, food processing, glass, oil, pharmaceutical, railroad, refrigeration, valve manufacturing, etc. Whether applied to production or to assembly, all these machines have a common objective—to control the factors which control costs (time, precision, finish, scrap, fatigue, safety) and thus to control profits. If your objective is high production at low unit cost, we invite your inquiries.

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SPECIAL MACHINES
CONTROL COSTS

24 Years of Successful Cooperation with Leading American Industries

SNYDER TOOL & ENGINEERING COMPANY

3400 E. LAFAYETTE, DETROIT 7, MICHIGAN

SEE OUR CATALOG IN SWEET'S FILE

Induction Hardened Parts

(*Continued from page* 39)

fingers are equipped with spring contacts which, when closed by the pressure of the rocker arm shaft, activates a microflex timer. Fingers are set so as to stop the shaft at the proper place in the work coil in order to harden the eight required areas.

When the contact on each of the fingers is closed, the sequence of the timer is to turn on the r-f power, turn off r-f power following the heating cycle, water quench the piece immediately after r-f power is off, and turn quench water off after the quenching cycle has been completed. The finger then turns slightly to allow the shaft to slide down the incline so as to strike the contact of the next finger. After all eight areas have been hardened, and the last finger has turned away allowing the shaft to slide off the incline, the air cylinder reaches back for another shaft. This next shaft slides into the work coil, stopping at the second finger, and repeats the eight hardening operations. The production rate is about 60 shafts per hour, a considerable improvement over previous methods.

Rods hardened one a second

Hardening of valve lifter rods is another application in the automobile industry which is cutting production costs. The fully automatic work fixture and a 20-kw induction heater, which is shown in the accompanying illustration, harden ends of rods at a rate of 3600 per hour. These particular rods are made of cold drawn SAE 1045 steel. They are approximately 9¼ in. long, and ¼ in. in diameter. Both ends are through hardened about ⅝ in. in from each end to a hardness in excess of Rockwell 55C. Rods are placed in a hopper, which holds more than 500 rods, in bunches of 100 or more. As the notched drums of three ½-in. wide circular plates rotate, the rods fall through an opening at the bottom of the hopper into a row of notches.

Rods are then carried through two hair-pin type work coils which heat the rod ends to the required hardening temperature. The speed of the drum can be controlled by a variable-speed motor. As soon as the rods leave the work coil they enter a quench block which floods the rod ends with water. Quenching is rapid, uniform and continuous. Quench water then falls into the sink of a standard work table and is drained off.

Shortly after quenching, rods fall free from the notches by means of gravity. The four prongs pointing into the drum catch the rods as they roll into a second bin. Thus, with very little handling, it is possible to harden over 7000 separate rod ends per hour. The only controls for operating the unit are switches for operating the revolving drum and the push-button station which turns the r-f induction power on or off.

When cold drawn SAE 1045 steel is used in this application, the hardened area must be drawn in hot oil. This must be done within 30 minutes of quenching in order to relieve stresses and prevent ends from cracking. It is also possible to quench rod ends with an oil flood quench using the same type of quench block. When this is done, it is, of course, necessary to use a steel which will give the desired hardness when quenched in oil. The oil would be recirculated and cooled to maintain the desired temperature. Such steels as SAE 1165, 1052 or 1066 may be used. The principal advantage in using them would be to eliminate the need for drawing back the rod ends after the hardening operation.

Another successful application of induction heating equipment is in the field of soldering oil gages at a continuous rate of one every two seconds. This particular application, equipped with an automatic work table, raised production rate to over 200 per cent over previous methods.

Turn-Milling Crankshafts

(*Continued from page 43*)

one downward from above.

After feeding to depth, the crankshaft starts to turn about its own axis. This makes it necessary for each cutter to move in and out on its own slide with harmonic motion as the cutters and their spindle continue to rotate. In consequence, the machine is more complex than that for the main bearing journals but the cuts are similar and involve the removal of metal from checks as well as from pin diameters.

Besides turn-milling, several other operations on the crankshaft are deserving of note. This machine work starts with milling locating spots on cheeks in a two-spindle Cincinnati machine. This is followed by turning the center main bearing journal, sprocket flange and oil slinger with high speed steel tools in the Wickes lathe already referred to, and then by the two turn-milling operations described above.

Next comes the drilling of oil holes in four Avey machines, of which one is shown in the illustration. These machines drill many holes some up to 5½ in. deep and at many odd angles on a total of 23 crankshafts an hour. All drill heads on these machines are equipped with heads that reverse the drill and back it out if the torque setting made is exceeded.

After drilling, crankshafts are checked for straightness and a small percentage requires straightening, done in a Fox "superflex" press. Shafts then go to a five-wheel Landis grinder which removes about 0.015 in. of metal from each of the five main bearing journals as the shaft revolves on centers. Hydraulic steady rests at the center three journals apply sufficient pressure to counteract that applied by the grinding wheels and thus avoid any springing of the shaft. This operation is followed by one on a single-wheel Norton that grinds the oil seal diameter which, because of its location, cannot be ground along with the main bearing journals.

Grinding of crank pins is done in other single-wheel Norton machines having chucks in which the shaft is clamped in four successive positions 90 deg apart, so as to rotate, of course, about the axes of the four respective pins in succession. This is followed by grinding the flange pilot and rear face in another conventional operation.

Many holes are drilled, reamed and tapped from both ends of the shaft on the Baker drilling machine fitted with a drum-like fixture that indexes each crankshaft through eight working stations. Holes on which these operations are performed include those in the flange to which the flywheel bolts, the lightening holes in No. 1 and 4 pins and the axial holes at the center of each end of the shaft. Certain of these holes are counterbored. At a rear position on this machine a milling cutter mounted on a short vertical spindle, with a separate motor drive and feed, cuts a keyway in the small diameter at the front end of the shaft while it is in this indexed position. This cutter is arranged, of course, to back out to clear the shaft after its cut has been made. This machine, which is completely automatic except for loading and unloading, handles 22 crankshafts per hour.

A Heald machine is used to precision bore the hole for the clutch shaft pilot bearing as the crankshaft turns on its own main journals. Then the shaft is transferred to a Wickes crankshaft lathe in which the OD of four counterweights are turned and chamfered as the shaft is rotated on its main bearing journals. Tools are fed in from both front and rear.

Dynamic balancing of the crankshaft is done in a horizontal General Motors machine after applying ring weights to the crank pins. Each weight is equivalent the rotating weight plus one half the reciprocating weight of two piston and rod assemblies. This machine is equipped with drills that

(*Turn to page 70, please*)

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remove from counterweights the metal needed to bring the assembly into proper balance and the machine stops automatically at the proper positions for this drilling besides setting the respective drills to remove the precise amount of metal to effect correct balance. Later, after a flywheel has been applied to the crankshaft, the assembly is again balanced dynamically in a second General Motors balancing machine.

After the first balancing, the crankshaft is put into a Schraner hydraulic machine that laps all bearings and all pins in a single operation. This is the final machining operation on the crankshaft which is then ready for assembly.

Federal Court Orders Sale of Playboy Assets

A federal court in Buffalo has ordered the sale of all assets of the Playboy Motor Car Corp. at public auction. A financial report filed in the court shows that the company spent nearly $1.8 million for engineering, materials, tooling, equipment, wages and salaries, and maintenance of the plant in an attempt to develop a small passenger car. The principal source of capital for the company was the sale of franchises to prospective dealers. Proceeds from such sales were reported to be in excess of $2 million.

Business in Brief

Written by the Guaranty Trust Co., New York, Exclusively for AUTOMOTIVE INDUSTRIES.

General business activity showed little variation during the week ended Aug. 6. Electric power production, railway freight loadings and crude oil output were lower than in the preceding week, while department store sales, construction and bituminous coal production increased. The *New York Times* index of activity for the week ended Aug. 6 stands at 139.5, as compared with 139.8 in the preceding week and 148.5 a year ago.

Sales of department stores during the week ended Aug. 6, as reported by the Federal Reserve Board, equaled 228 per cent of the 1935-39 average, as compared with 209 in the week before. Sales were 13 per cent below the corresponding distribution a year ago, as against a preceding decline of 11 per cent. The total in 1949 so far reported is five per cent less than the comparable sum in 1948.

Electric power production declined more than seasonally during the week ended Aug. 6. The output was 2.8 per cent above the corresponding amount in 1948, as compared with a similar advence of 3.1 per cent shown for the preceding week.

Railway freight loadings during the same period totaled 716,824 cars, 1.0 per cent less than the figure for the week before and 18.4 per cent below the corresponding number recorded in 1948.

Crude oil production in the week ended Aug. 6 averaged 4,669,700 bbl daily, 6900 bbl less than in the preceding week and 834,850 bbl under the comparable output in 1948.

Production of bituminous coal and lignite during the same week is estimated at 7,550,000 net tons, 190,000 more than the output in the week before but 4,625,000 below the corresponding quantity in 1948.

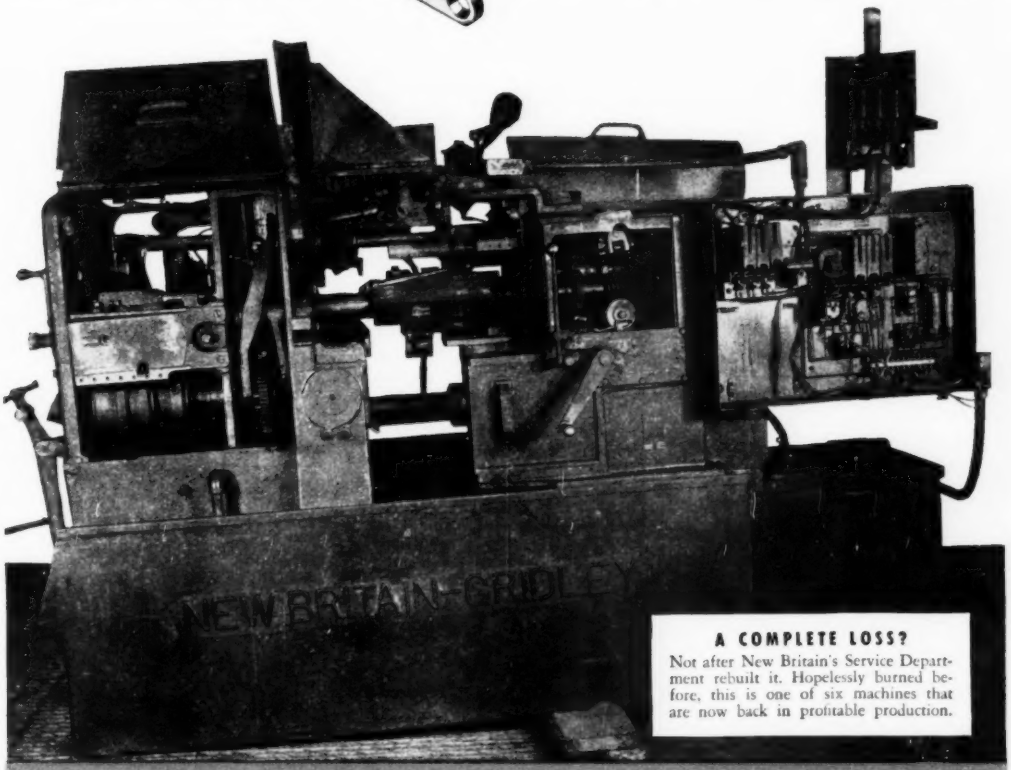
Civil engineering construction volume reported for the week ended Aug. 11, according to *Engineering News-Record*, was $257,314,000, or eight per cent more than the preceding weekly figure and 30 per cent above the comparable sum in 1948. This increase marks the second consecutive week in which the volume of construction has established a new record for the year. The total recorded for 32 weeks of this year was 19 per cent more than the corresponding amount in 1948. Private construction for the period was 15 per cent above that a year ago, and public construction increased by 22 per cent.

The wholesale price index of the Bureau of Labor Statistics during the week ended Aug. 9, at 152.7 per cent of the 1926 average, was 0.1 per cent more than in the preceding week but 10 per cent below the corresponding figure in 1948. Prices of farm products, textiles and building materials declined slightly, while advances were registered in most of the other major commodity groups.

Member bank reserve balances decreased $272 million during the week ended Aug 10. Underlying changes thus reflected include a decline of $289 million in Reserve bank credit and increases of $40 million in non-member deposits and other Federal Reserve accounts and $2 million in Treasury cash.

Total loans and investments of reporting member banks increased $538 million during the week ended Aug. 3.

Single Part...  *or Complete Rebuild...*



A COMPLETE LOSS?
Not after New Britain's Service Department rebuilt it. Hopelessly burned before, this is one of six machines that are now back in profitable production.

New Britain Owners Benefit from PROGRESSIVE & COMPLETE SERVICE FACILITIES

STOCK OF PARTS is maintained for all standard models. Immediate shipment via air express or air freight keeps lost time at a minimum.

FIRM QUOTATIONS on rebuilding or retooling. You know in advance what the job will cost.

REGIONAL SERVICE. Factory trained service experts are located in leading manufacturing cities.

PERSONAL SERVICE AT THE FACTORY. Trained personnel are available by phone at all times to help you get the most out of your New Britain equipment. Ask for customer service department.

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Automatics

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NEW BRITAIN-GRIDLEY MACHINE DIVISION
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Fiat's Modernization

(*Continued from page* 25)

factory rearrangement, and so on, for the Diesel engine division. Interim allotments will also be made to the extent of $300,000 for the agricultural equipment division, and about $200,000 for the railway rolling stock division.

Another half-million will be allotted to the heavy castings foundry for improvements. Included in current contracts let or to be placed is $1 million for a complete blooming mill and related equipment as well as $285,000 for new forging and foundry equipment. The ECA will also allot funds for the purchase in the U. S. of two 50-ton electric steel furnaces, a continuous pickling line, cold mills for narrow strip, a 2½-in. tube mill, and bolt and nut making equipment.

Currently, very little attention is being given to improving the aeronautical division. However, out of current authorization two dual-purpose machines were approved—one, an $18,000 vertical honing machine and the other, a $25,000 vertical boring machine.

As ECA officials see it, the business outlook for Fiat should be bright for some years to come, even with the proposed stepped-up production resulting from the modernization program. In addition to replacement of Fiat cars and trucks now in use, a considerable number of Army surplus vehicles, acquired after the war, must shortly be replaced. Also, both farm and Diesel equipment sales are expected to pick up, not alone because of anticipated reduction in cost but because the repute of Fiat products should normally help the export demand. Even at current pricing, Fiat is producing and selling 5000 tractors domestically and 2000 to the export trade.

Fiat is likewise well established for increasing its export business. In addition to its 260 dealers, 86 authorized repair shops, and 61 parts dealers in Italy, the firm has 26 branches, 74 dealers, and 350 sub-dealers outside the country.

Prewar export business in Fiat vehicles averaged about four per cent of the world's car export trade. With lower pricing and better quality from projected improvements in manufacturing, the ECA sees little reason why the combined domestic and export demand over the next several years should not rise to perhaps 100,000 units annually.

These 34-foot Fruehauf Stainless Steel refrigerated semi-trailers, pulled by Autocar tractors, are owned by a Chicago, Ill., trucking company.

FOR REFRIGERATED TRAILERS

There's nothing like Stainless Steel!

REFRIGERATED TRAILERS that haul produce, meats, and other perishable food products are real targets for corrosion. But corrosion doesn't have a chance when these units are constructed from Stainless Steel.

Stainless has high inherent resistance to the effects of moisture and the brine, salt and ice solutions used for refrigeration. Equally important, Stainless is easy to clean and to keep clean—a fact proved in hundreds of uses throughout the food industry.

Along with spotless cleanliness and freedom from corrosion, Stainless Steel construction makes possible bigger payloads and bigger profits. Since Stainless is $2\frac{1}{2}$ times as strong as ordinary steel, it permits construction that, while much lighter, is much stronger. The extra pounds of dead weight it eliminates become extra payload on every trip your trailer makes.

This combination of high corrosion resistance and maximum weight saving makes Stainless the ideal material, not only for refrigerated trailers, but for every type of highway hauling job. Add to this the longer life, lower maintenance, and pleasing appearance of Stainless Steel trailers, and it's easy to see why so many fleet operators call Stainless units "the best investment we ever made."

In U·S·S Stainless Steel, we offer you a *perfected*, service-tested Stainless that allows the widest latitude in design and the use of the most advanced manufacturing techniques. You'll get more for your money when you order equipment built from U·S·S Stainless Steel, because there's no better Stainless produced.

If you'd like to know more about the advantages of U·S·S Stainless, write for the booklet "An Introduction to Stainless Steel." Send your request to United States Steel Subsidiaries, 2094 Carnegie Building, Pittsburgh 30, Pa.

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SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

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UNITED STATES STEEL

Publications Available

(*Continued from page 58*)

D-59—Cylindrical Grinder

Landis Tool Company—Bulletin S-49 describes the new low cost Grindwell general purpose universal cylindrical grinder. Included are operation pictures, specifications and illustrated standard and extra equipment. The Grindwell is designed to do precision cylindrical grinding on a large variety of work. It is suitable for manufacturing, maintenance, tool room and training purposes.

D-60—Parts Designing

Climax Molybdenum Co.—A new 70-page booklet, Three Keys to Satisfaction, discusses the relation between design of parts and the choice of steel and its treatment. The attractive two-color booklet is in three sections covering—Design, Steel and Treatment.

D-61—Silent Chain Drives

Link-Belt Company—A new, 36-page illustrated booklet, No. 2065, on silent chain drives for automotive and industrial engines, buses and trucks, is available. The first section covers automotive timing chains, the second covers the heavier ⅝ in. and ¾ in. pitch chain for larger industrial engines on bus, truck and industrial applications.

D-62—Blast Cleaning Mill

American Wheelabrator & Equipment Corp.—Bulletin No. 134-A, complete with photographs, drawings and data on the features, construction and specifications of the newly redesigned Wheelabrator Tumblast, is available.

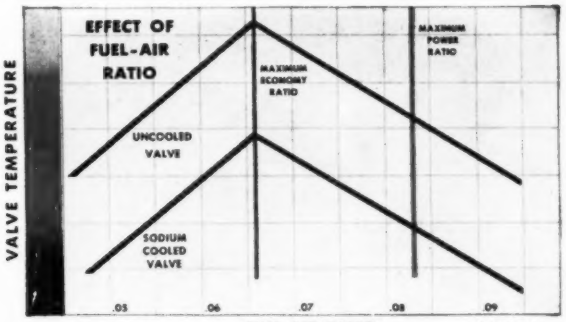
D-63—Shims, Lock Nuts, Stampings

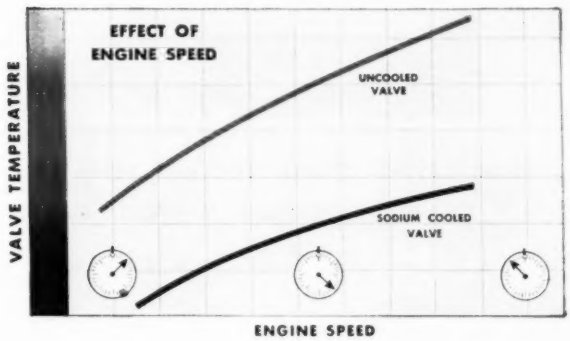
Laminated Shim Co., Inc.—A new Data File, dealing with the company's three major products, shims, lock nuts and stampings, has been published. It includes specifications, design factors, applications and informative material.

Why Sodium Cooled Valves?

The trend of modern engines is to operate at higher speed and more economical fuel-air ratio. In considering factors which influence exhaust valve life, temperature is the dominant one. High temperatures sharply reduce the resistance to corrosion, distortion, and fatigue life of the finest alloy steel. The effectiveness of sodium cooling in reducing valve temperatures is shown by the curves below, which are typical of recorded test data.

The curve "Effect of Fuel-Air Ratio" shows that as the mixture is leaned out to obtain maximum economy, valve temperatures rise. The curve showing "Effect of Engine Speed" indicates that temperature rises quite rapidly as speed increases.





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MANUFACTURING COMPANY
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Eaton engineers will welcome an opportunity to discuss the application of Eaton sodium cooled valves to engines proposed or now in design.

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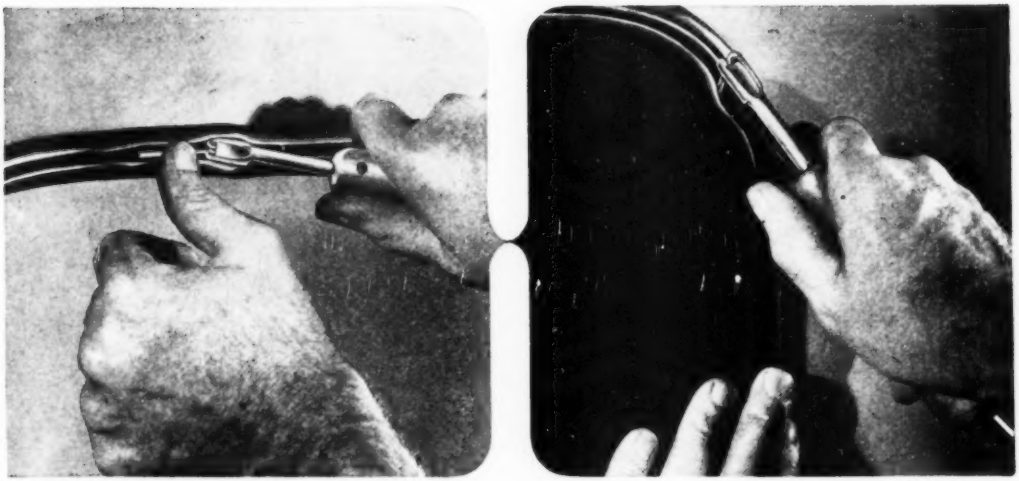

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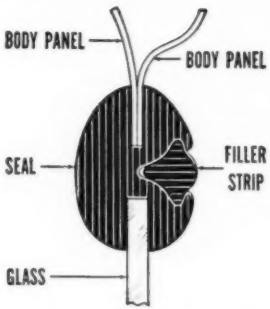
Inland Self-Sealing Weather Strip provides a permanent mechanical lock by itself . . . can't work loose or wear out. That means permanent weatherproofing . . . and complete protection, too, in any weather. It's why vehicle users prefer Inland Weather Strip, specify it whenever they can.

A wide variety of designs and shapes have been developed by Inland engineers to fit both standard and special body-panel openings. Write today for new catalog, containing full information.



See how easy it is? The seal goes readily onto the body panel. Then the glass fits into the seal. Then the filler strip is zipped into the locking channel. That window or windshield, and all the rest of them, are weatherproofed for keeps. Simple, easy, fast, economical.

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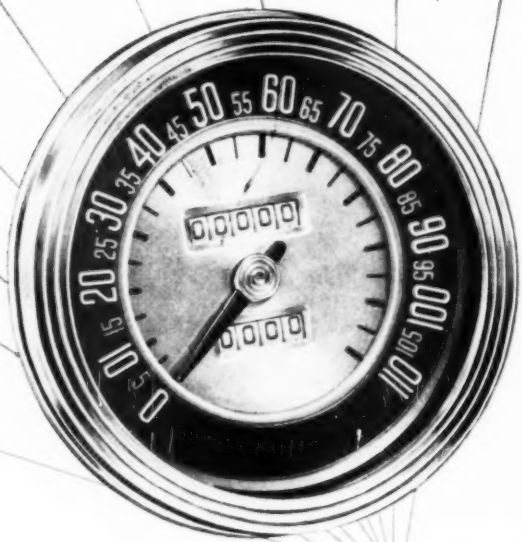
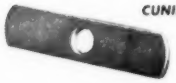
A greatly improved speedometer by KING-SEELEY



OLD TYPE MAGNET



NEW, CUNIFE MAGNET

The performance, dependability and service life of an automotive speedometer depends primarily on its permanent magnet and the ability of that magnet to retain its initial strength under all operating conditions.

A new and much superior magnet is now being used exclusively in King-Seeley speedometers. It is made of Cunife, a very powerful magnetic material having unusual physical properties which has made possible an instrument of greater accuracy, dependability and longer life.

Specifically, this new Cunife magnet provides 30% more force with only two-thirds of the weight of the previous magnet. The new material has reduced bearing load 50% and is 750% more stable. It is far more resistant to temperature variations, vibration, shock and the effects of stray magnetic fields.

This is another result of King-Seeley's continuing research program which has for many years led the march of progress in the field of automotive instruments.

5038

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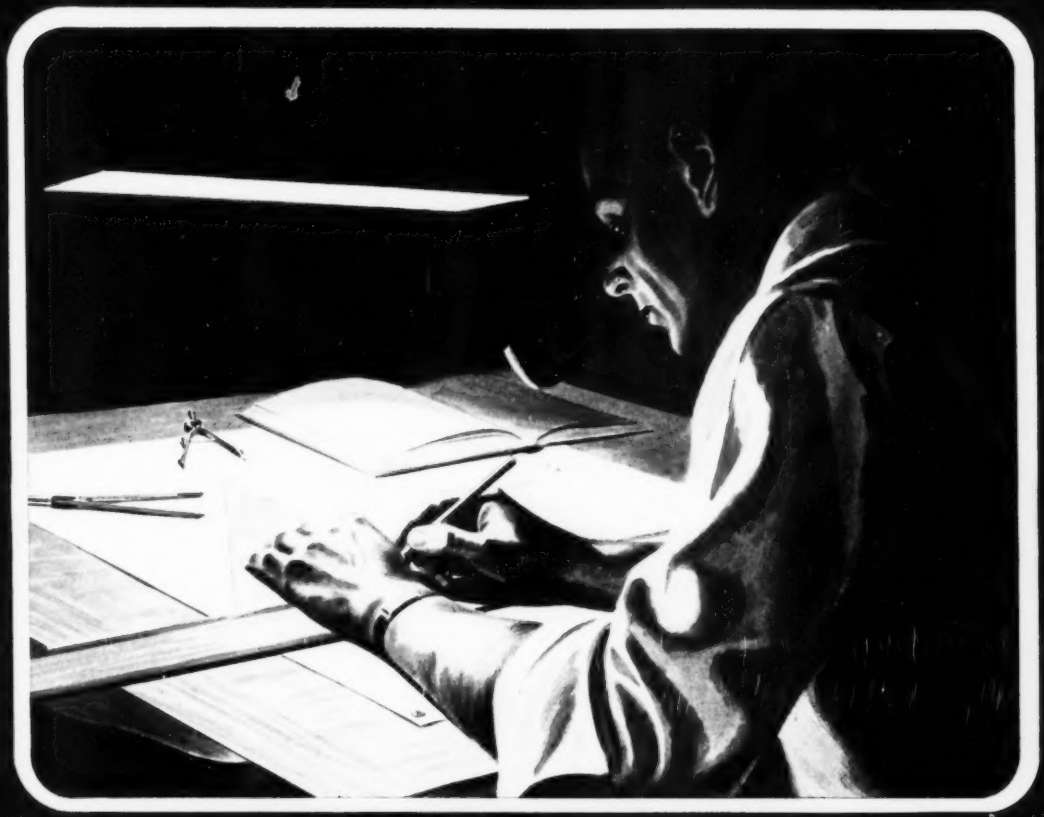

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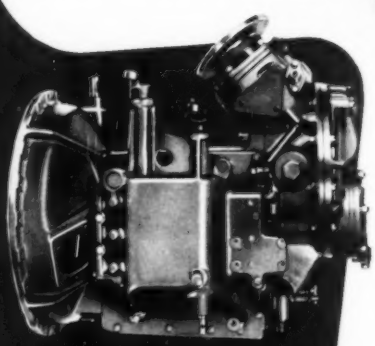

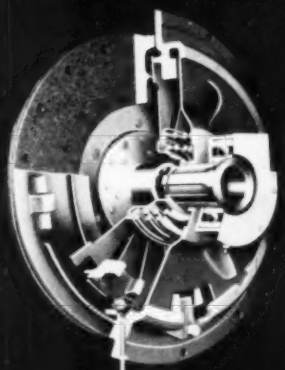

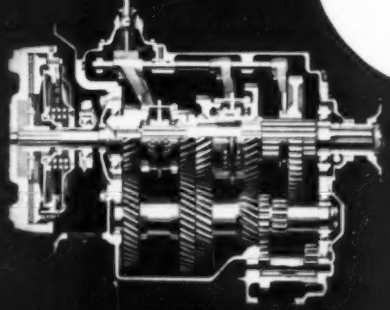

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Spicer has progressively BUILT FOR YOU during the past 45 years. BUILT FOR YOU with skill guided by the wisdom of experience. BUILT FOR YOU a range of products covering every need in the automotive power transmission field. BUILT FOR YOU a plant that employs the industry's most advanced production techniques and equipment.

The designing and manufacturing skill gained from producing millions and millions of Spicer units is used by a majority of manufacturers in the truck, bus and passenger car fields. Look to Spicer for assistance that BUILDS FOR YOU . . . all the way from the drawing board through to service in the field.

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2178 East Milwaukee Ave.
Detroit 11, Michigan

BONDERIZING Holds Paint to Metal . . . PARKERIZING Inhibits Rust . . . PARCO LUBRIZING Retards Wear on Friction Surfaces

AMERICAN PHILLIPS SCREWS

Play "close harmony" with musical instrument makers in <u>both</u> these vital ways...

1. "Sweet Music" in Production: Never a "sour note" of spoilage, delay or accident where these automatically straight-driving American Phillips Screws are used in assembly. Costly materials and hours of skilled workmanship are never wasted or lost. To the contrary, American Phillips Screws combine speed with precision so that *fastening time is cut* 50%, even on the fussiest work.

2. "Sweet Music" in Promotion: American Phillips Screws are "grace notes" in their clean, modern appearance on musical instruments and all other products... a signature of quality on the surface that certifies the quality within. Wherever you find American Phillips Screws, you find a product that sells well *and stays sold.* Write.

AMERICAN SCREW COMPANY, PROVIDENCE 1, RHODE ISLAND

Chicago 11: 589 E. Illinois St. Norristown, Pa. *Detroit 2:* 502 Stephenson Building

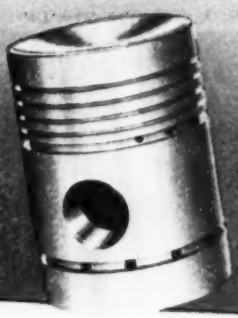
AMERICAN PHILLIPS *Screws*

ALL TYPES

ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)

Air Craft

Nelson
Auto-Thermic



Diesel

Trans Slot

Heavy Duty

Every Type Aluminum Piston ... *One* Standard of Quality

STERLING

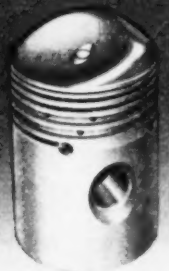
Leaders in Aluminum Pistons for 30 Years

Sterling Engineers will work with you as they have with other leading manufacturers in developing pistons to meet your exacting requirements. Wire or phone.

Wing Insert

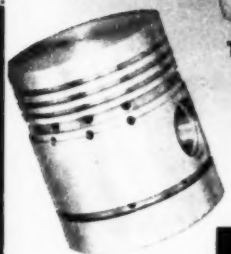
Two Cycle

Steel Truss



Turbulator head

T-Slot



Trunk Type

STERLING ALUMINUM PRODUCTS INC.

ST. LOUIS, MO.

KELSEY-HAYES

OFFERS 30% to 50% MORE POWER TO TRUCK and TRAILER POWER BRAKE SYSTEMS

with the

KH AUXILIARY VACUUM POWER PUMP

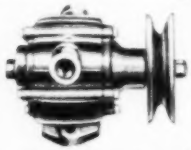
Here's an improvement you can easily add to the present power brake system of your trucks and trailers . . . and one that you actually can't afford to do without, because it has a remarkable safety advantage over your present conventional vacuum brake operation:

1. Maintains adequate reserve of vacuum power in the system, even when the engine manifold vacuum fluctuates widely, due to different operating conditions, engine wear or small leaks in the system.
2. Actually increases the vacuum power above the maintained adequate reserve, thus providing a far faster brake application that is 30% to 50% more effective, while retaining smooth action, easy control and low maintenance cost.

Kelsey-Hayes Auxiliary Vacuum Power Pumps are of utmost importance to every truck and trailer manufacturer, operator, and service man.

Kelsey-Hayes Distributors Will Gladly Furnish Fully Descriptive Literature.

The Midget that develops a GIANT'S strength!



Simple to install on V-8 or In-Line Engines . . .

Merely a small, simple addition to present, conventional power brake systems (no major units to replace).

Exceptionally sturdy, its few parts moving in a bath of oil have proven practically non-wearing during long, continuous service.

Complete kits available with dual check valve and lubricator for all power brake systems.

KnowHow ASSURES PROVEN PRODUCTS AT

KELSEY-HAYES WHEEL COMPANY

DETROIT 32, MICHIGAN

Wheels—Hub and Drum Assemblies—Brakes—"Vacdraulic" Brake Power Units—for Passenger Cars, Trucks, Buses—made by Kelsey-Hayes' 4 Michigan Plants and Windsor-Canada Plant • "Magdraulic" Electric Brakes • "Lathan" Vacuum Power Brake Equipment for Tractor-Trailers—made by Kelsey-Hayes' South San Francisco-Lathan Plant • Wheels—Hubs—Axles—Parts for Farm Implements—made by Kelsey-Hayes' French & Hecht Plant at Davenport, Iowa.

BOWER BEARINGS ARE SPHER-O-HONED

FOR GREATER DEPENDABILITY—LONGER LIFE

Extra years of smooth, trouble-free performance are built into every Bower SPHER-O-HONED bearing. This premium of dependability, the result of important new design and engineering improvements, keeps maintenance costs down —increases efficiency.

Contacting roll ends and flange surfaces of Bower SPHER-O-HONED bearings are spherical *before the bearing is installed.* This greatly reduces initial wear and resultant "end play." The large Bower oil groove solves oil failure problems by carrying a continuous supply of lubricant to all vital working parts. And the hard surfaces of Bower bearings mean greater precision, better alignment, longer life.

Leading manufacturers of earthmoving equipment use Bower SPHER-O-HONED bearings. They've found—and you will too—that for all-around reliable performance they're your best bearing buy.

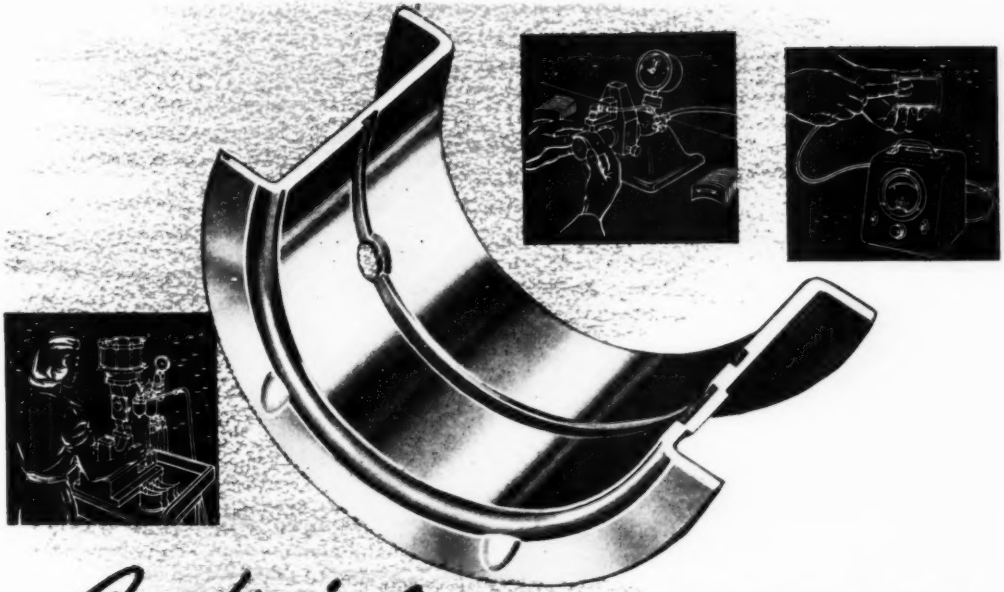
For more complete information, write for the Bower Engineering catalog.

BOWER ROLLER BEARING COMPANY
DETROIT 14, MICHIGAN

SPHER-O-HONED

BOWER

ROLLER BEARINGS



Combining PRODUCTION IN THE MILLIONS WITH QUALITY IN THE INDIVIDUAL BEARING

To assure top quality in mass production of sleeve bearings, at low cost, our Quality Control and Production Methods organization conducts as many as 108 separate tests for material quality and physical accuracy of the individual bearing. Specialists for almost 50 years, our six-plant organization is tailored to the peculiar needs of sleeve bearing production—from original research to field tests of the finished product. Our engineering department will gladly consult with you on your problems.

28 PRECISE MACHINE OPERATIONS

84 MEASUREMENT CHECKS

24 ADDITIONAL TESTS

are conducted on a strip-type, copper-lead lined, steel-backed flanged bearing.

HIGH SPEED, high temperature, automotive type bearings available in many combinations.

SPEED & LOAD bearings for pumps, compressors, industrial electric motors and similar uses.

HEAVY LOAD for big Diesels, power plants, etc.—bearings up to 27½" O.D., steel and bronze back.

BRONZE PARTS in many shapes, sizes; thrust washers, bushings; for many types of applications.

Power goes to work smoothly through

FEDERAL-MOGUL

FEDERAL-MOGUL CORPORATION

FEDERAL Mogul *Silent* SLEEVE BEARINGS

11037 SHOEMAKER, DETROIT 13, MICH.

it's the spring cushion action that makes Steelbestos the leading cylinder head gasket for internal combustion engines

Feature that made Steelbestos famous

Note how the tangs of the patented D-G fabrication firmly clinch the sheets of especially treated asbestos (one on each side) to the steel, providing the necessary cushion action for a perfect seal. Steelbestos is made for every compression range. Our engineers will be glad to assist in solving your gasket problems.

Steelbestos

DEE-GEE GASKETS ARE SOLD TO ORIGINAL EQUIPMENT MANUFACTURERS FOR THEIR PRODUCTION AND SERVICE

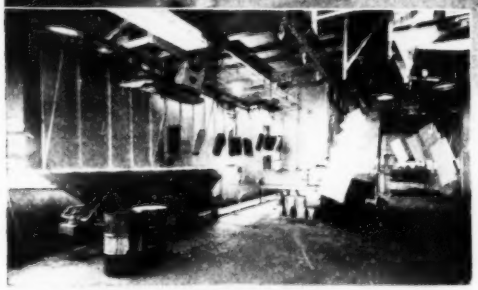
Serving all industry for over a quarter of a century

STEELBESTOS • TWIN-TYPE STEELBESTOS
D-G INSULATING MATERIALS • SYNTHETIC COMPOSITIONS
KORKOID • SPRINGOID • DELOID

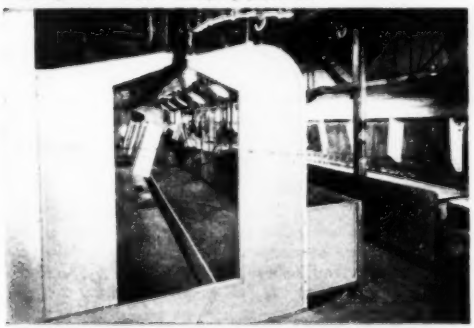
DETROIT GASKET & MANUFACTURING COMPANY
DETROIT 23, MICHIGAN

COMPLETE *Finishing* SYSTEMS

for ENAMEL • LACQUER • PAINT



Mahon Portable Dip Enameling Tanks which may be wheeled into the production line at any time a change in color is desired. Lower illustration shows a Portable Dip Tank in position in the production line. This arrangement permits switching to any one of four different colors in dip enameling operations on one conveyor line without interrupting production.



Mahon Hydro-Filter Spray Booths in two spray finishing production lines—part of the same Mahon Self-housed Finishing System.

Portable Dip Tanks Permit Application of FOUR DIFFERENT COLORS on ONE PRODUCTION LINE!

Illustrated here are parts of a complete self-housed Mahon Finishing System recently installed for the Coleman Company, Wichita, Kan. It is the second complete Mahon system purchased by the Coleman Company in four years. This Complete Finishing System, which was built adjacent to manufacturing buildings, consists of a six stage Cleaning and Rust Proofing Machine, one Dry-off Oven, a Filtered Air Supply System, three Hydro-Filter Spray Booths —one of which is 70 ft. long, one Paint Baking Oven for sprayed parts, one Paint Baking Oven for dipped parts, and four Portable Dip Enameling Tanks which permit switching to any one of four colors without interrupting production. The whole system was planned, engineered, built and housed by Mahon—one responsibility for final results. Progressive manufacturers everywhere are well aware of the important part modern, efficient, cost-reducing production equipment plays in today's competitive markets. That is why so many successful concerns turn to Mahon for top efficiency in modern finishing equipment . . . they know that the Mahon organization has pioneered development in this highly specialized field for twenty-nine years . . . they know also, that world-wide experience, covering virtually every industry where finishing constitutes a major production operation, has endowed Mahon engineers with a wealth of technicel knowledge and practical know-how not available elsewhere. Write for Catalog No. 649, or see it in Sweet's Mech. Ind. File.

THE R. C. MAHON COMPANY

HOME OFFICE and PLANT, Detroit 11, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems—including Pickling Equipment, Metal Cleaning and Rust Proofing Equipment, Dry-off Ovens, Hydro-Filter Spray Booths, Filtered Air Supply Systems, and Drying and Baking Ovens. Also, Core Ovens, Dust Collectors, and many other Units of Production Equipment.

MAHON

The Baird 76H Chucking Machine has Versatility

combines turning, drilling, tapping, threading, milling and other operations.

Some of the EXCLUSIVE FEATURES, which have made the Baird 7 Six-Spindle Horizontal Indexing Lathes outstanding are:

★ **INDEPENDENT TOOL SLIDES**

The longitudinal tool slides may have different strokes and the cross slides are independent and have their strokes, all as best suits the job. All tool slides have micrometer adjustment.

★ **DIFFERENT SPEEDS AT SPINDLES**

Ability to choose a speed for the spindle at each work station to suit the operation to be performed at the station permits the best product in least time.

★ **AUTOMATIC CHUCKING**

Operator has both hands free to handle the work. No levers or handles to require his attention or take his time.

★ **ATTACHMENTS**

Several readily applied attachments are available to perform extra operations and reduce handling, thus speeding production.

★ **AUTOMATIC MECHANICAL STOP**

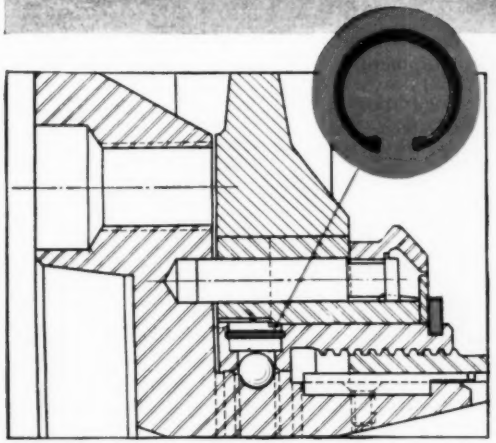
Stops machine at end of each cycle if operator has not unloaded and reloaded in the proper operation of machine. This and other safety features make for least loss due to damage, and for greatest safety.

"ASK BAIRD ABOUT IT"

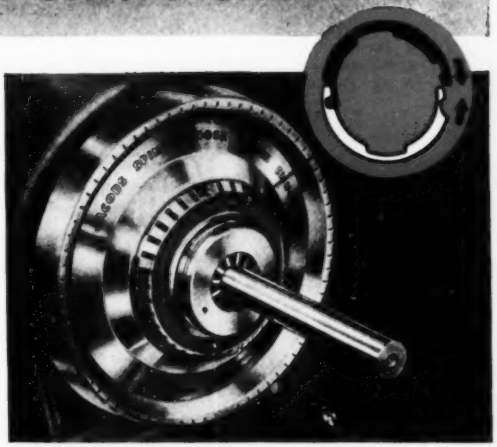
OTHER BAIRD MACHINES: MULTIPLE SPINDLE GRINDERS, WIRE FORMING MACHINES, PRESSES, TUMBLING EQUIPMENT

THE BAIRD MACHINE COMPANY
STRATFORD, CONN.

2 Waldes Truarc Rings Save Space ...cut costs...Lock entire chuck



INTERNAL RING: Used instead of a shoulder screw, Truarc internal ring #5000-37 locks disc over ball loading hole. Saves 1/8 inch in overall diameter. Eliminates tapping. Withstands machine vibration and vibration from impact device within chuck. Used with Truarc pliers, it facilitates assembly and disassembly.



INTERLOCKING RING: Used instead of a locknut, Truarc interlocking ring #5107-343 locks handwheel assembly securely on impact sleeve of Jacobs chuck. Saves 7/32 inch in overall length. Eliminates tapping. Chuck's top speed: 5000 RPM; Truarc ring is dynamically balanced to withstand 50,000 RPM's. Services easily with a screwdriver.

2 Waldes Truarc Retaining Rings secure the entire mechanism of new spindle nose lathe chuck for Jacobs Mfg. Co., Hartford, Conn. Truarc gives Jacobs a finer, more compact product, and at lower cost than possible with any other fastening device.

Wherever you use machined shoulders, nuts, bolts, snap rings, cotter pins, there's a Truarc Ring that does a better job of holding parts together.

Truarc Rings are precision engineered. Quick and easy to assemble, disassemble. Always circular to give a never-failing grip. They can be used over and over again.

Find out what Truarc Rings can do for you. Send your drawings to Waldes Truarc Engineers for individual attention, without obligation.

2 TRUARC RINGS GIVE 6 BIG ADVANTAGES

- **Cut overall length 7/32 in.**
- **Cut overall diameter 1/8 in.**
- **Eliminate cost of tapping**
- **Withstand up to 50,000 RPM's, give a factor of assurance of 10**
- **Withstand machine vibration**
- **Facilitate assembly, disassembly**

WALDES

TRUARC

REG. U. S. PAT. OFF.

RETAINING RINGS

WALDES KOHINOOR, INC., LONG ISLAND CITY 1, NEW YORK

WALDES TRUARC RETAINING RINGS ARE PROTECTED BY U. S. PATS. 2,302,948; 2,026,454; 2,410,852 AND OTHER PATS. PEND.

Waldes Kohinoor, Inc., 47-16 Austel Place AY-91
Long Island City 1, N. Y.

Please send 28-page Data Book on Waldes Truarc Retaining Rings.

Name_____

Title_____

Company_____

Business Address_____

City_____ Zone_____ State_____ ★

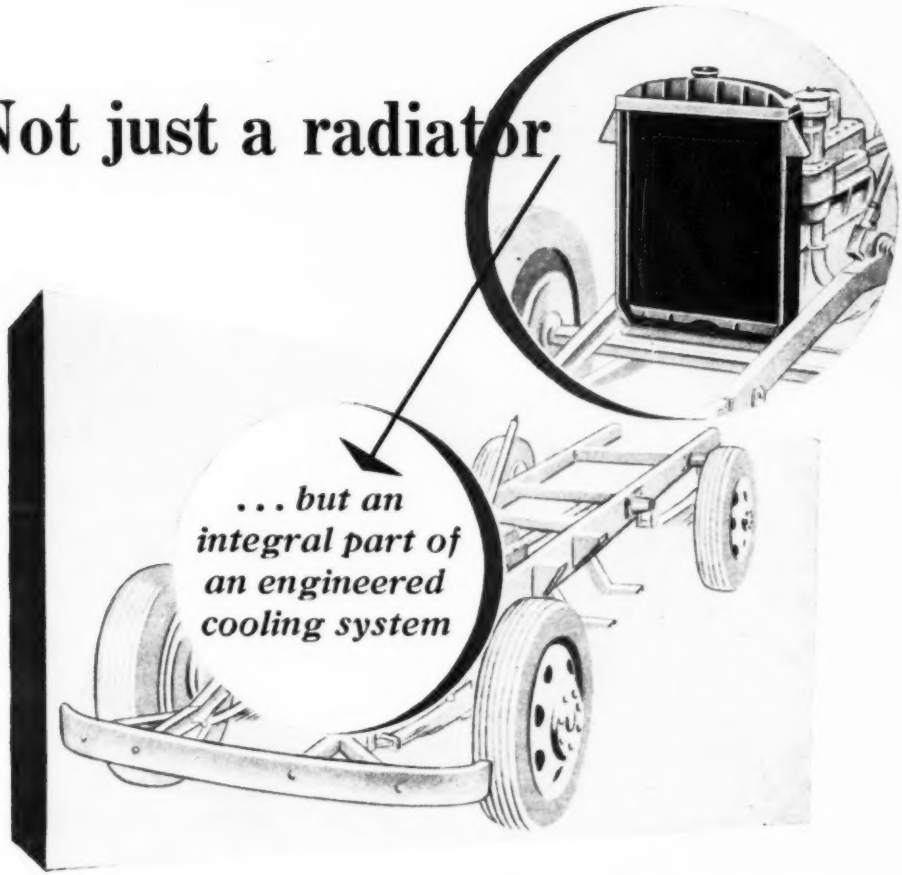
Classified Advertisement

FOR SALE—LUBE & COOLANT SERVICE EQUIPMENT COOLANT SERVICE TRUCKS 1 dirty oil tank & 1 clean oil tank, each 275 gal. pump valved to serve both tanks, driven by 32 volt D. C. motor. Power supplied from battery or Ready-power driven unit. $275.00. TON UNITS & LUBE EQUIPMENT CARRIERS Y & T electric platform trucks (K25-A). Platform 42 in. by 60 in. by 12 in. high. 4000 lb. capacity. Operator rides. Will tow and furnish pumping power to coolant service trucks and will carry lubricant and lube equipment on platform. Used one year; Cost new $3450; Price $1000.00. Also 1000 lb. capacity Bastner truck, price $100.00. Mr. Warner, Liberty Planers, Inc., Hamilton, Ohio.

Index to Advertisers

The Advertisers' Index is published as a convenience, and not as part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert.

Not just a radiator



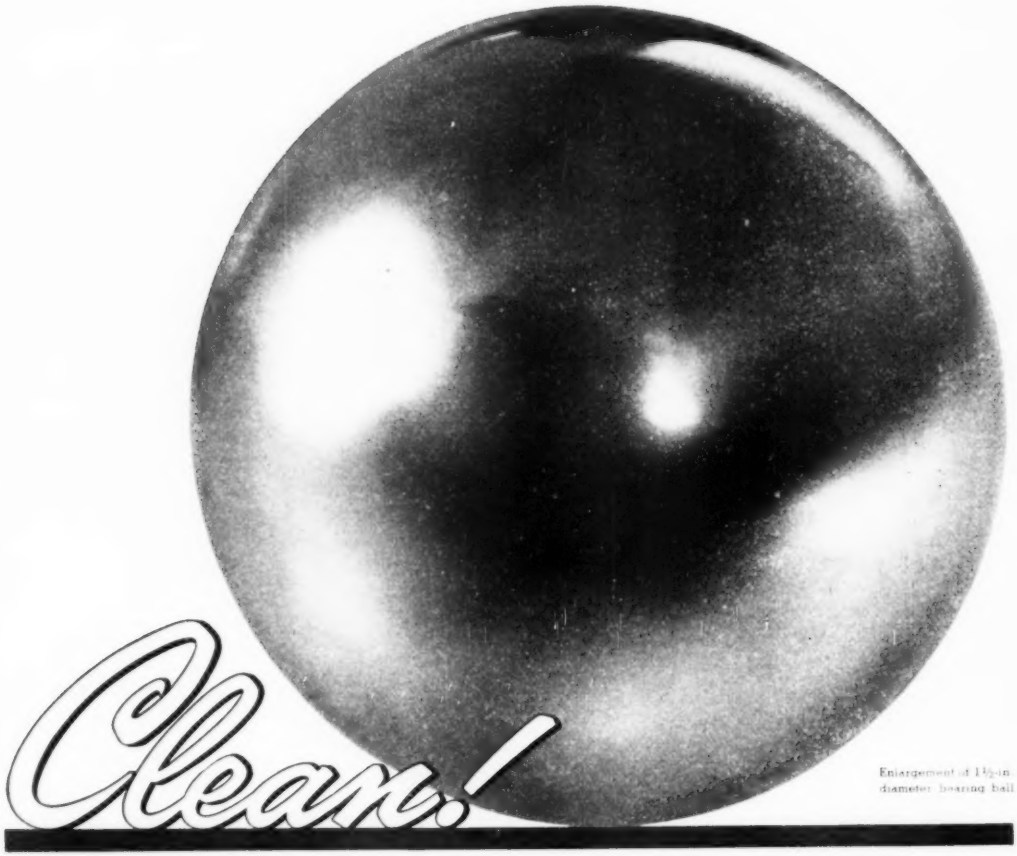
When a manufacturer of cars, trucks, buses or tractors consults Harrison on a cooling problem, some pretty important *cost savings* are likely to result.

Harrison tackles the *over-all cooling problem* . . . fan location, shrouding of the radiator core, restrictions to air movement, size of fittings, method of mounting and other factors. And Harrison's recommendations lead to an engineered cooling system that *saves* on core costs, *saves* on mounting costs, *saves* on parts costs.

Let Harrison's complete Testing Laboratories, extensive field experience and unmatched manufacturing facilities give you better cooling at lower cost. Harrison Radiator Division, General Motors Corporation, Lockport, N. Y.

HARRISON

RADIATORS, THERMOSTATS, HEATERS, DEFROSTERS, OIL COOLERS



Enlargement of 1½-in. diameter bearing ball

ELECTRIC-FURNACE BEARING STEELS

Only steel that is internally clean can be ground and lapped to a brilliant surface without flaws that might break the protective oil film, and in that way lead to premature failure of anti-friction bearing components. Steel that is internally clean helps to reduce substantially the unit cost of producing balls, rollers, and races alike.

With this in mind Bethlehem manufactures electric-furnace bearing steels in which the non-metallic inclusions are negligible. Besides this all-important feature the analysis, microstructure, hardness and other essential properties of these steels are rigidly controlled to meet the exacting specifications of the anti-friction bearing industry.

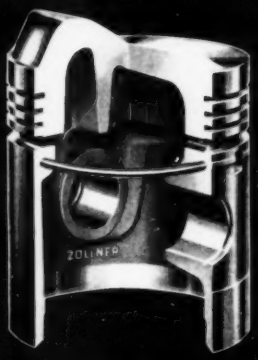
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor Bethlehem Steel Export Corporation

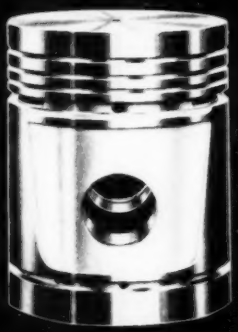
BETHLEHEM ALLOY STEELS

BETHLEHEM STEEL

T SLOT



"STEEL BELTED"



TRANSLOT

PISTONS SPECIFICALLY DESIGNED FOR YOUR GASOLINE ENGINE

Original Equipment in America's Finest Motors

WAUKESHA	IHC
GMC	CONTINENTAL
HERCULES	HALL-SCOTT
ENGINES	SEAGRAVE
CORBITT	BUDA
FWD	FEDERAL
DIAMOND-T	MARMON-
TWIN COACH	HERRINGTON
REO	CUMMINS
MACK	

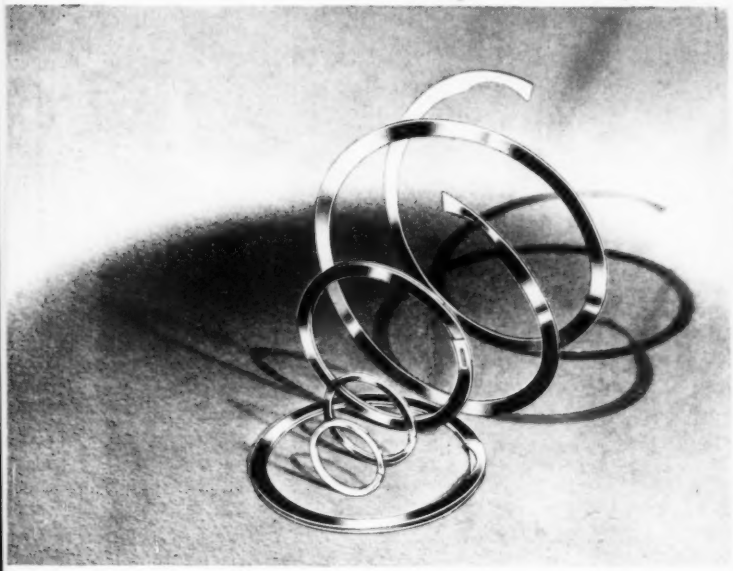
ZOLLNER

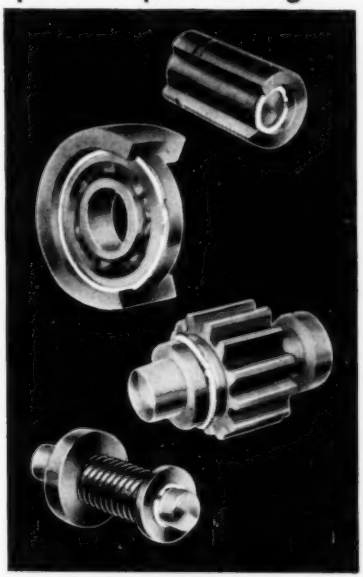
PISTON EQUIPMENT

for INTERNAL COMBUSTION ENGINES —BOTH GASOLINE AND DIESEL

ZOLLNER MACHINE WORKS, FORT WAYNE, IND.

Spirolox saves machining • assembly time • parts • space • weight





...Send for Test Samples!

Prove how you hold moving parts together better with **SpirOlox!**

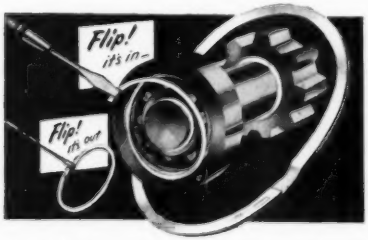
Practical men usually visualize best when they have the actual product in hand. That is why we suggest that you write for a sample Spirolox Retaining Ring, to get the feel of it. Or perhaps you'd like some for experiment. Mail our Spirolox Application Engineer a print of your product and you will be sent the appropriate rings for test, without cost or obligation, of course.

WHAT THIS REMARKABLE RING BRINGS YOU

Spirolox Retaining Rings provide a surprising total of betterments which every machine manufacturer wants. They position and lock all kinds of moving parts. They make machines simpler, lighter, more compact. They eliminate costly machining, and the nuts, pins, keys, collars, and the like formerly used in fastening. These rings spiral-into their grooves easily, saving time in manual installation. They adapt readily to fixtures for automatic production line installation. They stay put, yet they come out again at the flip of a screw driver, ready for re-use—a great advantage when machines are serviced in users' hands.

When you spiral-in a Spirolox Retaining Ring, one more part is positioned precisely and locked securely. Due to its two-turn coil construction, Spirolox locks in the groove under thrust, will carry loads up to its full shear strength—will not jump out or squeeze out. Due to the lighter weight of Spirolox, centrifugal force does not tend to affect its locking characteristic.

START SPIROLOX BETTERMENTS YOUR WAY NOW! *Send us a print of your product, get Spirolox Retaining Ring test samples for a convincing test in your own plant! And—write for suggestive new bulletin. No charge, no obligation.*



imagine

SpirOlox RETAINING RINGS on Your product!

gapless • concentric • requires no special tools • easy-in, easy-out • re-usable • stays put

Patent Pending

Product of Ramsey Corporation, *for 31 Years Makers of Original Equipment and Replacement Piston Rings. Office: 3704 Forest Park Boulevard, St. Louis 8, Missouri. Factories: St. Louis and Sullivan, Missouri; Fruitport, Michigan; Toronto 8, Ontario, Canada.* YR-5871